RECORD OF DECISION

Himco Dump
Elkhart, Indiana

FIGURES AND TABLES

SUMMARY OF REMEDIAL ALTERNATIVE SELECTION

Himco Dump

A. SITE LOCATION AND DESCRIPTION

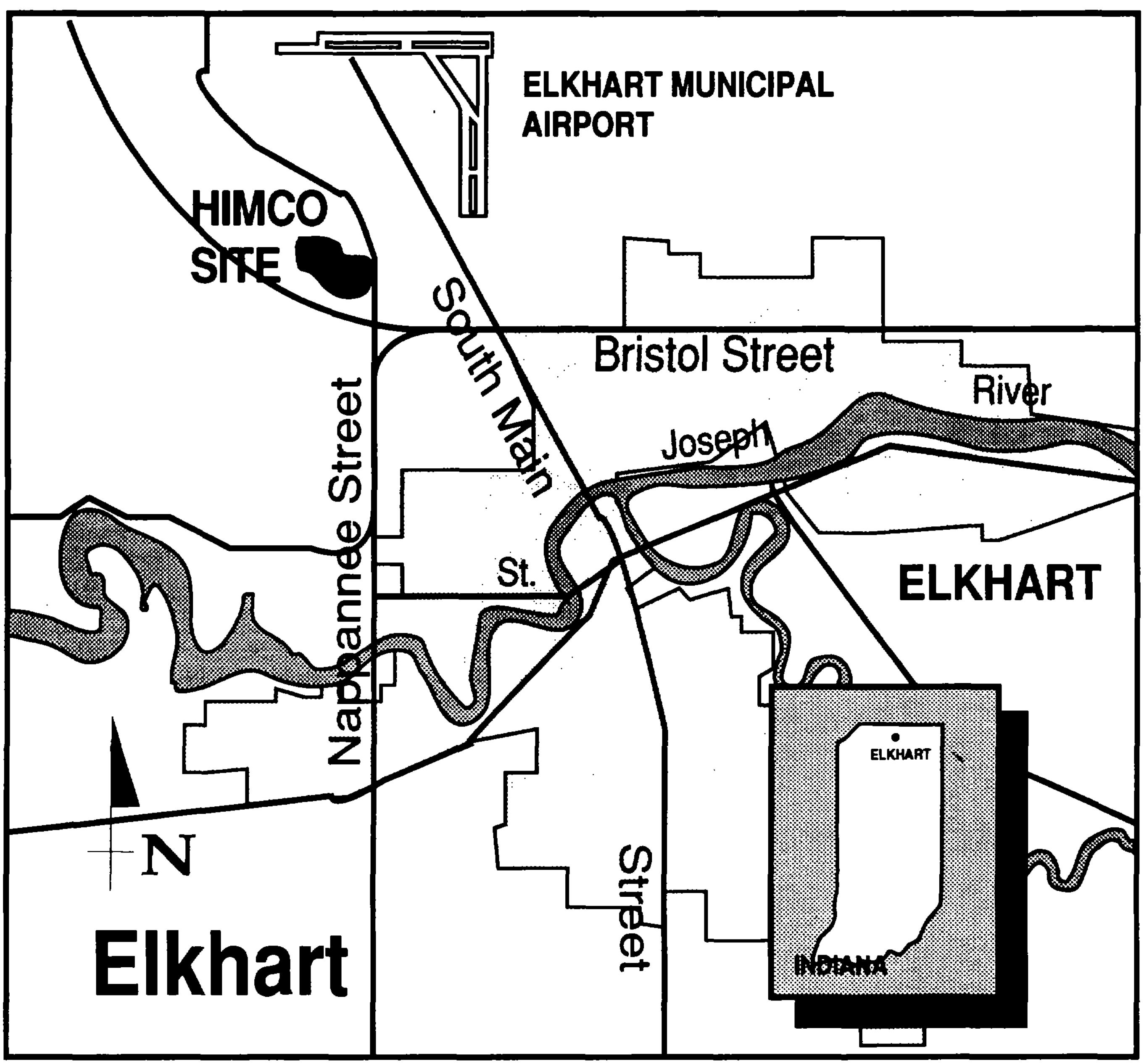
The Himco Dump site is a closed landfill located at County Road 10 and the Nappanee Street Extension in Cleveland Township, adjacent to the City of Elkhart, Elkhart County, Indiana. The site is located approximately two miles north of the St. Joseph River which runs east-west through the City of Elkhart. See Figure 1. The site covers approximately 100 acres and is bounded on the north by a tree line and the northernmost extent of a gravel pit pond; on the south by County Road 10 and private residences; on the east by the Nappanee Street Extension; and a section of land west of two ponds (an L shaped pond called the "L" pond, and the small pond) comprise the western boundary.

The landfill area is covered with a layer of sand, under which is a layer of white, powdery, calcium sulfate. The western half of the landfill cover is vegetated with grasses; the eastern half with grasses, bushes, and young trees. An area south of the landfill and north of County Road 10, the construction debris area, contains many small piles of rubble, concrete, asphalt, and metal debris. The construction debris area extends across the landfill boundary and onto property owned by adjacent landowners.

There was an abandoned gravel pit operation in the northeast corner of the site. An old truck scale and other concrete structures were also present in this area. During an inspection in December, 1992 by the Indiana Department of Environmental Management [IDEM], it was observed that these structures had recently been tampered with and removed. The gravel pit is filled with water which is approximately 30 feet deep. Two smaller and shallower ponds, the L pond and the small pond, are on the west side of the site. See Figure 2.

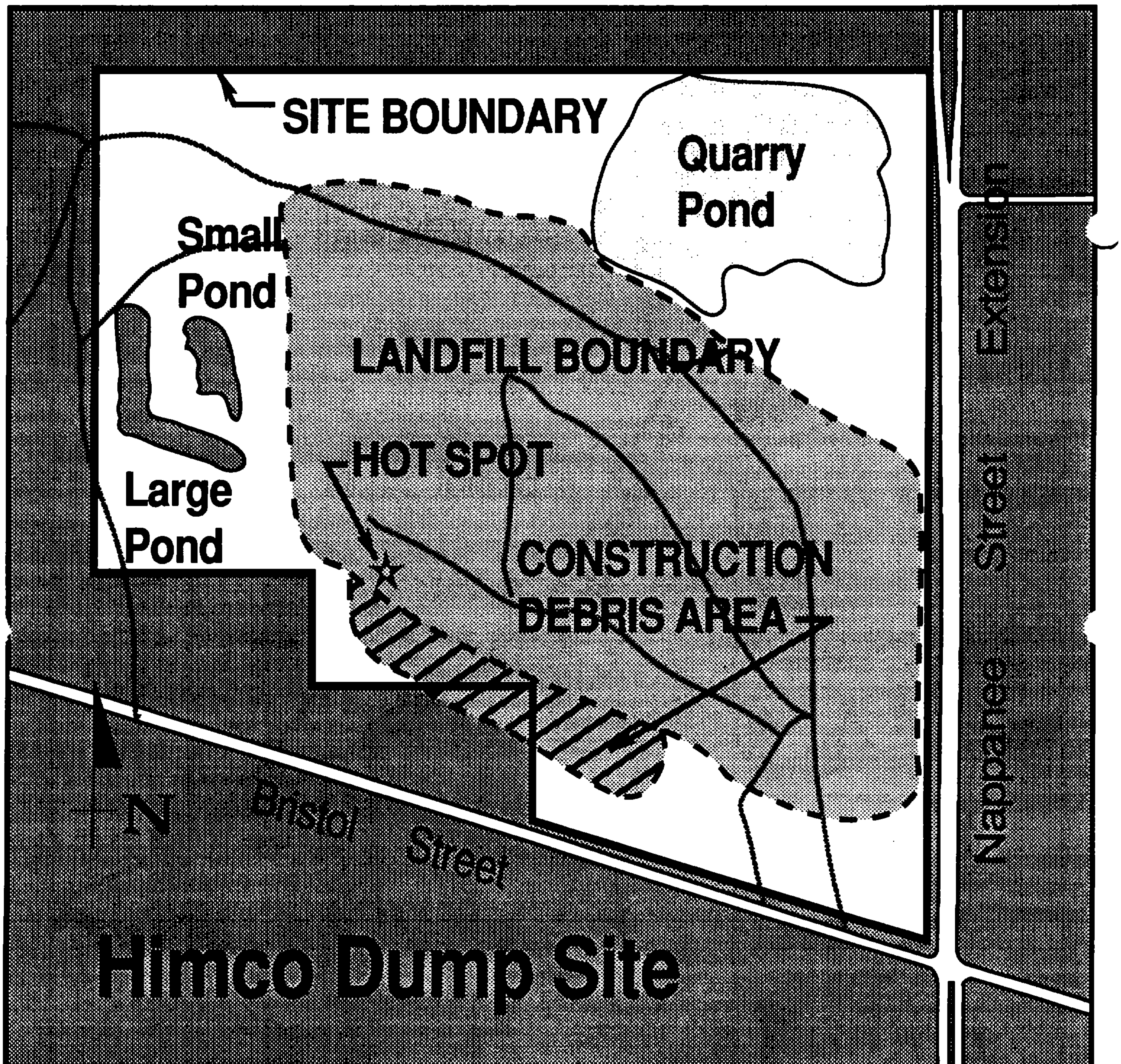
The site is not fenced. In the vicinity of the site are agricultural, residential, and light industrial land uses. There is an access road which leads from the southeast corner of the site near the intersection of County Road 10 and Nappanee Street Extension. A locked gate is present across this road; however, vehicles can easily drive around the gate and enter the site.

FIGURE 1



ELKHART MUNICIPAL AIRPORT
HIMCO SITE
South Main
Bristol Street
River
Joseph
St.
Nappanee Street
ELKHART
ELKHART
INDIANA
N
Street
Elkhart

FIGURE 2



SITE BOUNDARY
Quarry
Pond
Small
Pond
LANDFILL BOUNDARY
HOT SPOT
Large
Pond
CONSTRUCTION
DEBRIS AREA
N
Bristol
Street
Nappanee
Street
Extension
Himco Dump Site

B. SITE HISTORY AND ENFORCEMENT ACTIVITIES

The Himco site was privately operated by Himco Waste Away Service, Inc., and was in operation between 1960 and September 1976. As of January 1990, the parcels of land which comprise the landfill were owned by the following individuals or corporations: Miles Inc.; CLD Corporation; Alonzo Craft, Jr.; and Indiana and Michigan Electric Company.

The area was initially a marsh and grassland. There was no liner, no leachate collection, nor gas recovery system constructed as part of the landfill. Refuse was placed at ground surface across the site and in trenches excavated to approximately 10 to 15 feet deep, the width of a truck and 30 feet long, in the eastern area of the site. Solid waste refuse was reportedly dumped in the trenches and burned.

In 1971, the Indiana State Board of Health (ISBH) first identified the Himco site as an open dump. In early 1974, residents along County Road 10 south of the Himco site complained to ISBH about color, taste, and odor problems with their shallow wells. Analyses were conducted from samples of six shallow wells along County Road 10, ranging in depth from 20 to 30 feet. These samples showed the wells were highly contaminated with manganese. Mr. Chuck Himes, the principal landfill operator, replaced these wells with deeper wells ranging in depth from 152 to 172 feet below ground surface. By mid 1990, the wells showed high concentrations of sodium which posed a chronic health threat to the residents. By November 1990, municipal water service was provided to those residents whose wells were affected. The cost of this action was financed by Miles Inc. and Himco Waste-Away Service, Inc.

In 1976, the landfill was closed and covered with approximately one foot of sand overlying a calcium sulfate layer.

In 1984, a U.S. EPA field investigation team conducted a site inspection. Analyses from monitoring wells showed that the groundwater downgradient of the site was contaminated by volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), and metals. During the site inspection, leachate seeps were observed.

In June 1988, the Himco site was proposed for the National Priorities List (NPL) and in February 1990, was officially placed on the NPL and designated a Superfund site. The site Remedial Investigation/Feasibility Study (RI/FS) was begun in 1989 and completed in 1992.

During the Remedial Investigation (RI), a "hot spot" (an isolated area of highly concentrated contaminants) was identified at the southwest border of the landfill. See Figure 2. This area showed high levels of VOCs contamination. On May 22, 1992, U.S. EPA initiated an emergency removal action, which located and removed 71 55-gallon drums containing VOCs such as toluene and ethylbenzene. Although other hot spots have not been identified, it is not certain whether additional pockets of drums exist.

C. HIGHLIGHTS OF COMMUNITY PARTICIPATION

U.S. EPA issued a fact sheet to the public in July 1990, at the beginning of the RI. The Agency also hosted a public meeting on July 12, 1990, to provide background on the Himco Dump site, explain the Superfund process, and provide details of the upcoming investigation. U.S. EPA issued a second fact sheet in May 1992, to notify residents in the vicinity of the site of the "hot spot" assessment and possible emergency removal action (this action was conducted, as stated above).

The RI/FS reports and the Proposed Plan for the Himco Dump site were released to the public for review in September, 1992. Information repositories have been established at the two following locations: the Elkhart Public Library Reference Department, 300 South Second Street, Elkhart, In 46516; and the Pierre Moran Branch Library, 2400 Benham Avenue, Elkhart, IN 46517. The Administrative Record has been made available to the public at the U.S. EPA Docket Room in Region V and at the two libraries.

A public meeting was held on October 6, 1992 to discuss the FS and the Proposed Plan. At this meeting, representatives from the U.S. EPA and IDEM answered questions about the Site and the remedial alternatives under consideration. Formal oral comments on the Proposed Plan were documented by a court reporter. A verbatim transcript of this public meeting has been placed in the information repositories and administrative record. Written comments were also accepted at this meeting. The meeting was attended by approximately 70 persons, including local residents and PRPs.

The FS and Proposed Plan were available for public comment from September 30, 1992 through November 30, 1992. Comments received during the public comment period and the U.S. EPA's responses to those comments are included in the attached Responsiveness Summary, which is a part of this ROD. Advertisements announcing the availability of the Proposed Plan, start of the comment period and extension of the comment period were published in the Elkhart Truth.

The public participation requirements of CERCLA sections 113 (k) (2) (i-v) and 117 of CERCLA have been met in the remedy selection process. This decision document presents the selected remedial action for the Himco Dump site chosen in accordance with CERCLA, as amended by SARA and, to the extent practicable, the National

Contingency Plan (NCP). The decision for this Site is based on the administrative record.

D. SCOPE OF THE SELECTED REMEDY

This ROD addresses the final remedy for the Site. The threats posed by this Site to human health and the environment result from source material in the landfill and from surface and subsurface soil in the southern portion of the landfill (referred to as the construction debris area) and in an area immediately south of the landfill. This response action will contain the source material and will be conducted in accordance with applicable or relevant and appropriate requirements of Federal and State law. U.S. EPA considers containment of the landfill material, which is a potential source of groundwater contamination, to be the most practicable remedy.

This remedy utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable for the site. However, because treatment of the principal threats of the site was not found to be practicable, this remedy does not satisfy the statutory preference for treatment as a principal element of the remedy. The size of the landfill and the fact that it is not known where or if any remaining on-site hot spots exist that represent the major sources of contamination, preclude a remedy in which contaminants could be excavated and treated effectively.

Because this remedy will result in hazardous substances remaining on-site above health-based levels, a five year review will be conducted to ensure that the remedy continues to provide adequate protection of human health and the environment.

E. SUMMARY OF CURRENT SITE CONDITIONS

The RI performed at the Himco Dump Site was designed to characterize the nature and extent of contamination posed by hazardous materials at the site and to conduct a human health risk and ecological assessment. The RI included sampling and analysis of groundwater, surface and subsurface soils, waste mass gas under the landfill cover, leachate collected from within the landfill, and surface water and sediments from the three ponds on the site (quarry pond, L-pond and small pond).

Based on the results of the RI, U.S. EPA has determined that the threats to human health and the environment are through future exposure by ingestion, inhalation or direct contact to VOCs, SVOCs and inorganic compounds through soil and groundwater pathways at the site. U.S. EPA has also determined that there is a significant potential for contamination of the aquifer because of the lack of any adequate natural or man-made barrier to impede leachate flow into the aquifer.

The following conditions were observed at the site:

1. Topography

The Himco Site is located in Elkhart County, Indiana. Elkhart County lies in the Great Lakes section of the Central Lowlands Physiographic Province. The present topography is a result of continental glaciation. The land surface consists of nearly level and gently sloping eolian and outwash sands in the northern part of the county; level to moderately sloping outwash terraces and plains in the northern and central portions of the county; and nearly level to strongly sloping glacial till plains in the eastern and western portions.

The land surface elevation in Elkhart County ranges from 950 feet in the southeast to 740 feet Mean Sea Level (MSL) in the west at the St. Joseph River (USGS, 1981).

2. Geology

The general site area is characterized as sand and gravel outwash deposits, comprised of alternating beds, varying in thickness, of poorly- to well-graded sands and gravels, and gravel-sand-silt mixtures ranging in thickness from approximately 200 to 500 feet below ground surface with an average thickness of 175 feet. These outwash deposits constitute the primary groundwater aquifer at the site. Minor seams of silt and clay were also encountered, but there was no indication of a consistent confining layer beneath the site.

3. Hydrology

Groundwater occurs in the study area at depths ranging from 5 to 20 feet below ground surface ranging from 752 to 756 feet (MSL). The elevation of the bottom of the waste mass is estimated to range from 755 to 760 feet (MSL) The outwash aquifer is unconfined below the Himco Site, and the silt and clay confining layer is absent. Groundwater flow is generally to the south, southeast, toward the St. Joseph River, a groundwater discharge area. Local groundwater flow appears to be consistent with regional conditions. The average groundwater flow velocity is estimated to be 121 feet/year. Three specific groundwater characteristics which may be important factors in contaminant migration include low horizontal gradient, low upward vertical gradients, and fluctuations in water table levels. Groundwater fluctuations at the Himco Site may be important because water table elevations are relatively near the landfill waste. Upward fluctuations may result in a more direct contact between groundwater and the waste mass thereby providing a more rapid mechanism by which contaminants from the landfill enter the groundwater system.

4. Contamination

a. Source

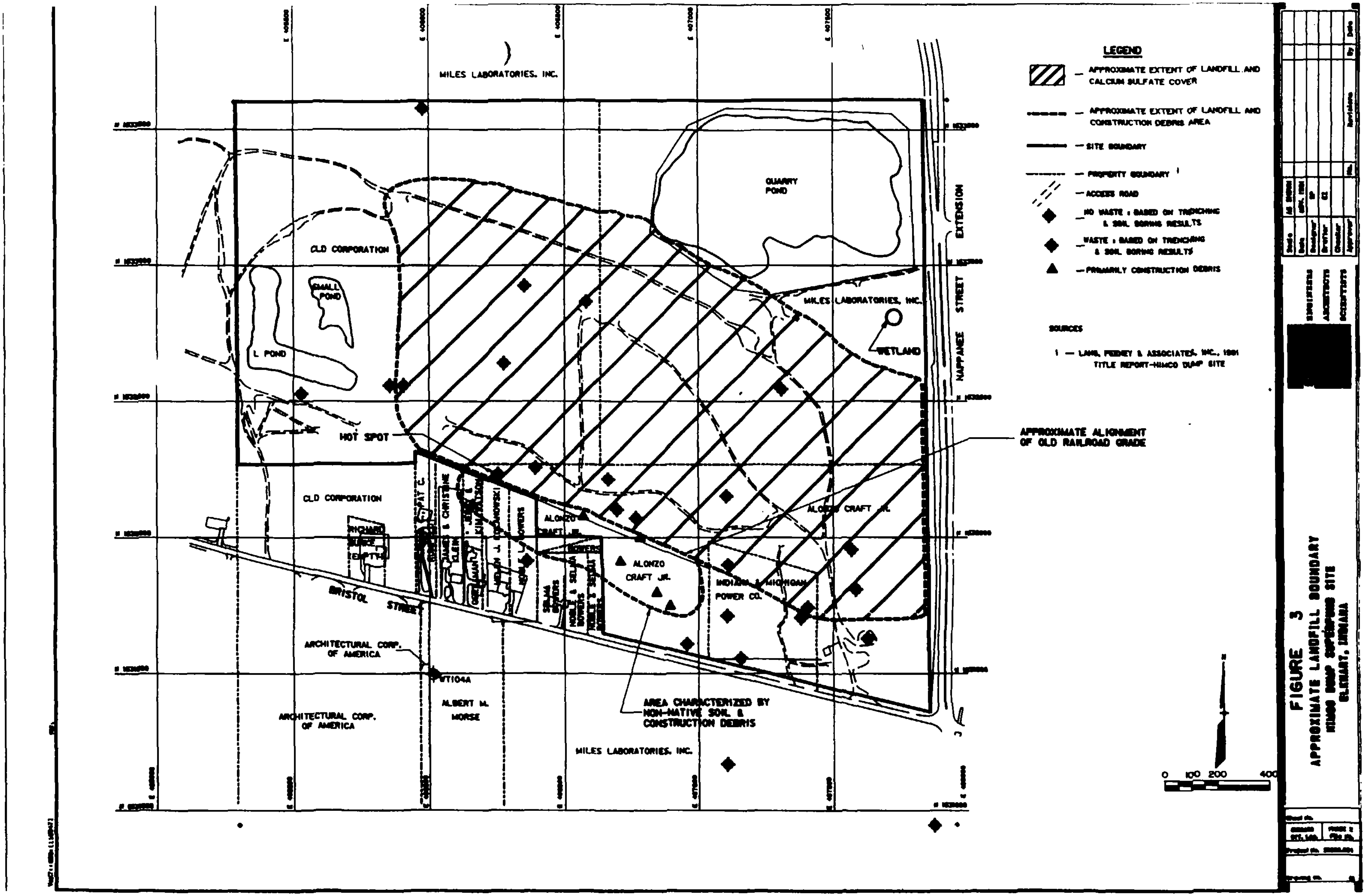
The source of contamination from the Himco Site is the landfilled waste. A proper cap was never installed, thereby allowing precipitation to infiltrate through hazardous constituents in the landfill and leak into the groundwater. In addition, there is a possibility of air emissions of VOCs and SVOCs through the existing cover. Test pit excavations in the landfill revealed the presence of a non-homogenous waste matrix. In addition, leachate was observed in the majority of trenches excavated at elevations above the water table. Leachate collected at the southwest corner of the landfill was red and brown and separated into two phases. The floating phase of the leachate contained approximately 48 percent toluene by weight. This location has been referred to as the "hot spot" in the landfill. An emergency removal was conducted in May 1992 to remove this hot spot. Figure 2 shows the location of the hot spot.

Generally, three fill layers were observed consistently in the landfill. The top layer can be characterized as a silty, sand cover, soil fill which ranged in thickness from a thin veneer to several feet. Underlying the sand cover, and in some cases at ground surface, calcium sulfate was found. It varied in thickness from a few inches to as much as nine feet at the southeastern, central, and southern areas of the landfill. Overall, the thickness was found to be less than 2 feet in 62.5 percent of test pit excavations. The areal extent of the calcium layer is shown in Figure 3. Beneath the calcium sulfate layer, an estimated 15- to 20-foot thick waste layer was found. This waste layer was found to include paper, plastic rubber, wood, glass, metal (including drums), as well as small amounts of hospital wastes.

Non-native soil mixed with construction debris was observed in test pits outside the landfill area along the south central and southwest edge of the landfill. This section is referred to as the construction debris area and is identified in Figure 3. No calcium sulfate was found in this area. SVOC contamination was found to be most prominent in surface soil samples collected here.

b. Groundwater

Two rounds of groundwater sampling during the RI revealed



MILES LABORATORIES, INC.
LEGEND
— APPROXIMATE EXTENT OF LANDFILL AND CALCIUM SULFATE COVER
— APPROXIMATE EXTENT OF LANDFILL AND CONSTRUCTION DEBRIS AREA
— SITE BOUNDARY
— PROPERTY BOUNDARY 1
— ACCESS ROAD
NO WASTE : BASED ON TRENCHING & SOIL BORING RESULTS
WASTE : BASED ON TRENCHING & SOIL BORING RESULTS
— PRIMARILY CONSTRUCTION DEBRIS
SOURCES
1 — LAWS, PEENEY & ASSOCIATES, INC., 1991 TITLE REPORT-HIMCO DUMP SITE
QUARRY POND
CLD CORPORATION
SMALL POND
L POND
MILES LABORATORIES, INC.
WETLAND
NAPPANEE STREET EXTENSION
HOT SPOT
APPROXIMATE ALIGNMENT OF OLD RAILROAD GRADE
CLD CORPORATION
ALONZO CRAFT JR.
ALONZO CRAFT JR.
ALONZO CRAFT JR.
INDIANA & MICHIGAN POWER CO.
BRISTOL STREET
ARCHITECTURAL CORP. OF AMERICA
WT104A
ALBERT M. MORSE
ARCHITECTURAL CORP. OF AMERICA
AREA CHARACTERIZED BY NON-NATIVE SOIL & CONSTRUCTION DEBRIS
MILES LABORATORIES, INC.
0 100 200 400
[redacted]
FIGURE 3
APPROXIMATE LANDFILL BOUNDARY
HIMCO DUMP SUPERFUND SITE
ELKHART, INDIANA

limited groundwater contamination outside the boundaries of the waste. In general, trace amounts of VOCs and SVOCs were detected in groundwater samples. During RI Phase I sampling, trichloroethene was detected above MCLs in two wells, J1 and J2, which are located approximately 2,000 feet off-site and side gradient to the Himco site.

In the wells south of the landfill, MCLs for nine chemicals were exceeded at least once; however, it has not yet been established that the contamination results from the site. Most were inorganics (antimony, arsenic, beryllium, chromium, lead, nickel and sulfate), although low levels of VOCs were also detected. Beryllium contamination was found at similar detection levels in background wells. Arsenic and antimony were detected at significantly higher concentrations than in background wells. Except for beryllium, nickel and sulfate, all the chemicals which exceeded MCLs south of the landfill also exceeded MCLs in the trench leachate samples.

c. Leachate

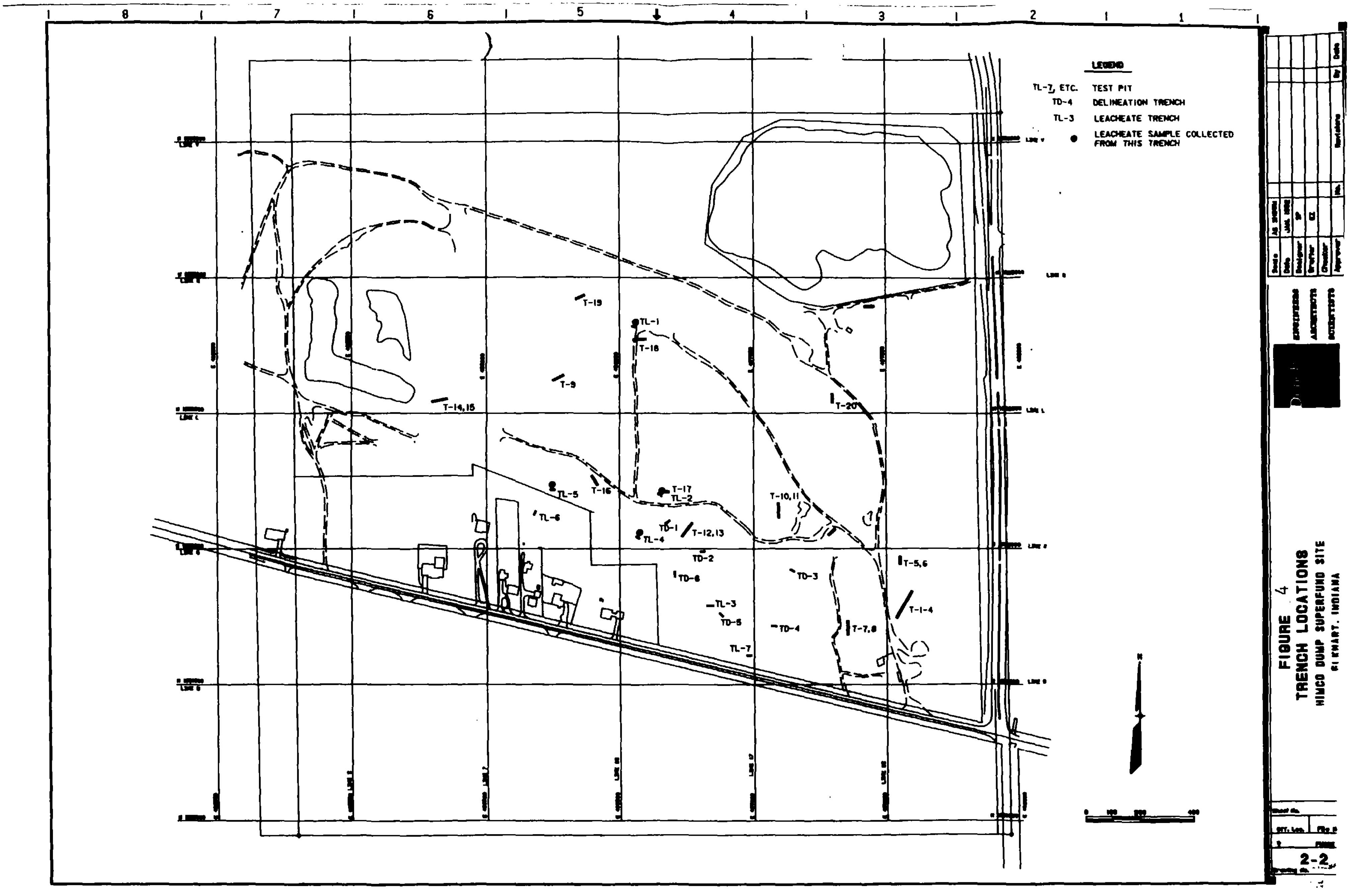
Leachate was sampled from four test pits and analyzed for VOCs, SVOCs, pesticides/PCBs, metals/cyanide, and water quality. Figure 4 shows trench locations. Leachate from test pit TL5 separated into two phases of almost pure product and leachate. Analysis of the pure product phase showed approximately 50% toluene.

Concentrations of VOC and inorganic contaminants detected in leachate were typically orders of magnitude higher than groundwater concentrations. The highest concentrations of VOCs and SVOCs were detected in leachate from TL5. Traces of pesticides were detected in leachate TL1 and TL2.

There are no adequate natural or man-made barriers to isolate leachate from groundwater at this site. Leachate may potentially enter the groundwater due to the gravity flow. Contaminants entering the groundwater may potentially migrate off-site through the local and regional groundwater flow.

d. Soil

Contaminants were detected primarily in surface soils. Arsenic and beryllium were detected in surface soil samples located across the western half of the site, around the quarry pond, and in the south-central area, which is characterized by non-native soil and construction debris. The highest concentrations of arsenic were detected in soil samples from the south central area. Beryllium was detected at several locations at relatively consistent


LEGEND
TL-7, ETC. TEST PIT
TD-4 DELINEATION TRENCH
TL-3 LEACHEATE TRENCH
LEACHEATE SAMPLE COLLECTED FROM THIS TRENCH
T-19
TL-1
T-18
T-9
T-14,15
T-20
TL-5
T-16
T-17
TL-2
T-10,11
TL-6
TD-1
T-12,13
TL-4
TD-2
TD-6
T-5,6
TD-3
TL-3
T-1-4
TD-5
TD-4
T-7,8
TL-7
FIGURE 4
TRENCH LOCATIONS
HIMCO DUMP SUPERFUND SITE
ELKHART, INDIANA
2-2

concentrations.

VOCs were detected in many places across the site at low concentrations. SVOC soil contamination was found to be most prominent in samples collected in the south-central area which is characterized by non-native soil and construction debris. Pesticides were detected in two soil samples collected from this area. A summary of inorganic, VOC, and SVOC concentration ranges may be found in tables 1, 2, and 3 respectively. Figure 5 presents the locations where SVOCs were detected.

F. SUMMARY OF SITE RISKS

The analytical data collected during the RI and the baseline risk assessment indicated the presence of contaminants in various media at levels that may present a risk to human health. Pursuant to the NCP, a baseline risk assessment was performed based on data from the RI. The baseline risk assessment assumes no corrective action will take place and that no site-use restrictions or institutional controls such as fencing, groundwater use restrictions or construction restrictions will be imposed. The risk assessment then determines actual or potential carcinogenic risks or toxic effects the chemical contaminants at the site pose under either current or future land use assumptions.

1. Contaminant Identification

The media of concern for human exposures for current and future scenarios were identified primarily as groundwater and soils which have been contaminated from the landfilled wastes. During the RI several chemicals in different media were detected and a list of "chemicals of potential concern" was developed using the following criteria:

- Any chemical detected at least once in any on-site soil, groundwater, leachate, surface water or sediment sample was considered to be a possible chemical of concern.

- Several chemicals known to be essential for human nutrition were eliminated. These chemicals were present at levels that are considered non-toxic.

- Samples considered to be background were not used in the selection process, nor were the data from residential wells just south of the landfill due to the uncertainty regarding the integrity of those residential wells.

TABLE 1

SUMMARY OF INORGANIC ANALYTES DETECTED IN SURFACE SOIL
HIMCO DUMP SUPERFUND SITE
ELKHART, INDIANA
1992

Analyte	Background (mg/kg) B-02	B-04	B-06	95% * Lower/Upper Levels (Background)	Range of Concentrations Detected (mg/kg)
Aluminum	5,100(J)	5,720	3,920(J)	3,655/6,172	9.7(B)-6,780(J)
Antimony	ND	ND	ND	4.3/4.3	3.1(BJ)-46.8
Arsenic	1.5(B)	2.0(B)	1.1(BJ)	0.91/2.2	0.47(B)-5.8
Barium	62	61.1	35.5(BJ)	32.2/73.6	1.3(BJ)-101
Beryllium	.69(BJ)	.27(BJ)	ND	ND/0.77	0.20(BJ)-0.91(BJ)
Cadmium	ND	ND	ND	.06/.06	1.1(B)
Calcium	386(B)	498(B)	736(B)	294/786	360(B)-321,000(J)
Chromium	6.5(J)	7.1	4.5	4.2/7.9	1.1(B)-13.2
Cobalt	3.7(B)	3.3(B)	ND	0.49/4.7	1.5(B)-5.3(B)
Copper	4.7(B)	4.3(BJ)	3.8(BJ)	3.7/4.9	1.3(B)-216
Iron	6,370	6,740	4,690(J)	4,429/7,437	9.8(BJ)-10,100
Lead	7.8	7.0	81(J)	ND/90	0.5(BJ)-245(J)
Magnesium	762(B)	976(B)	440(BJ)	355/1,097	14.6(BJ)-14,000
Manganese	402	421	70(J)	2,519/569	1.3(BJ)-561(J)
Mercury	ND	ND	ND	.06/.06	0.13(J)-0.54(J)
Nickel	6.5(B)	7.5(B)	ND	.29/9.8	2.4(B)-12.0
Potassium	252(B)	213(B)	115(B)	96.2/291	86.6(B)-678(B)
Selenium	0.25(BJ)	ND	ND	0.23/0.44	0.27(BJ)-1.4(J)
Silver	ND	ND	ND	0.50/0.50	0.49(B)-2.8(BJ)
Sodium	ND	ND	ND	5.0/5.0	20.8(B)-90.6(B)
Thallium	ND	ND	ND	0.24/0.24	ND
Vanadium	11.8	11.6	10.4(BJ)	10.2/12.3	1.6(BJ)-19.1
Zinc	20.5	22.4	8.4	6.7/27.6	1.7(B)-229
Cyanide	ND	ND	ND	0.60/0.60	1.3-24.3

Qualifiers

ND - Below detection limit
B - Analyte found in the associated blank as well as in the sample
J - Indicates an estimated value
* - Half of the detection limits were used for non-detects

TABLE 2

SUMMARY OF VOLATILE ORGANIC COMPOUNDS DETECTED IN SURFACE SOILS
HIMCO DUMP SUPERFUND SITE
ELKHART, INDIANA
1992

Compound	Background * (ug/kg)	Range of Concentrations Detected (ug/kg)
Methylene Chloride	ND	3(J)-16
Acetone	ND	8(BJ)-140
Carbon Disulfide	ND	0.8(J)
1,1-Dichloroethene	ND	5(J)
2-Butanone	ND	2(J)-8
Tetrachloroethene	ND	6(J)
Trichloroethene	ND	0.9(J)-4(J)
Toluene	8	2(J)-31
Ethyl Benzene	ND	0.7(J)-2(J)
Styrene	ND	0.8(J)
Xylenes (total)	ND	0.7(J)-6
1,2-Dichloroethene (total)	ND	ND
1,1,1-Trichloroethane	ND	ND

Qualifiers

ND - Below detection limit
J - Indicates an estimated value
* - Samples from borings B-02, B-04, and B-06 (0' to 2')

A/R/HIMCO/AJ2

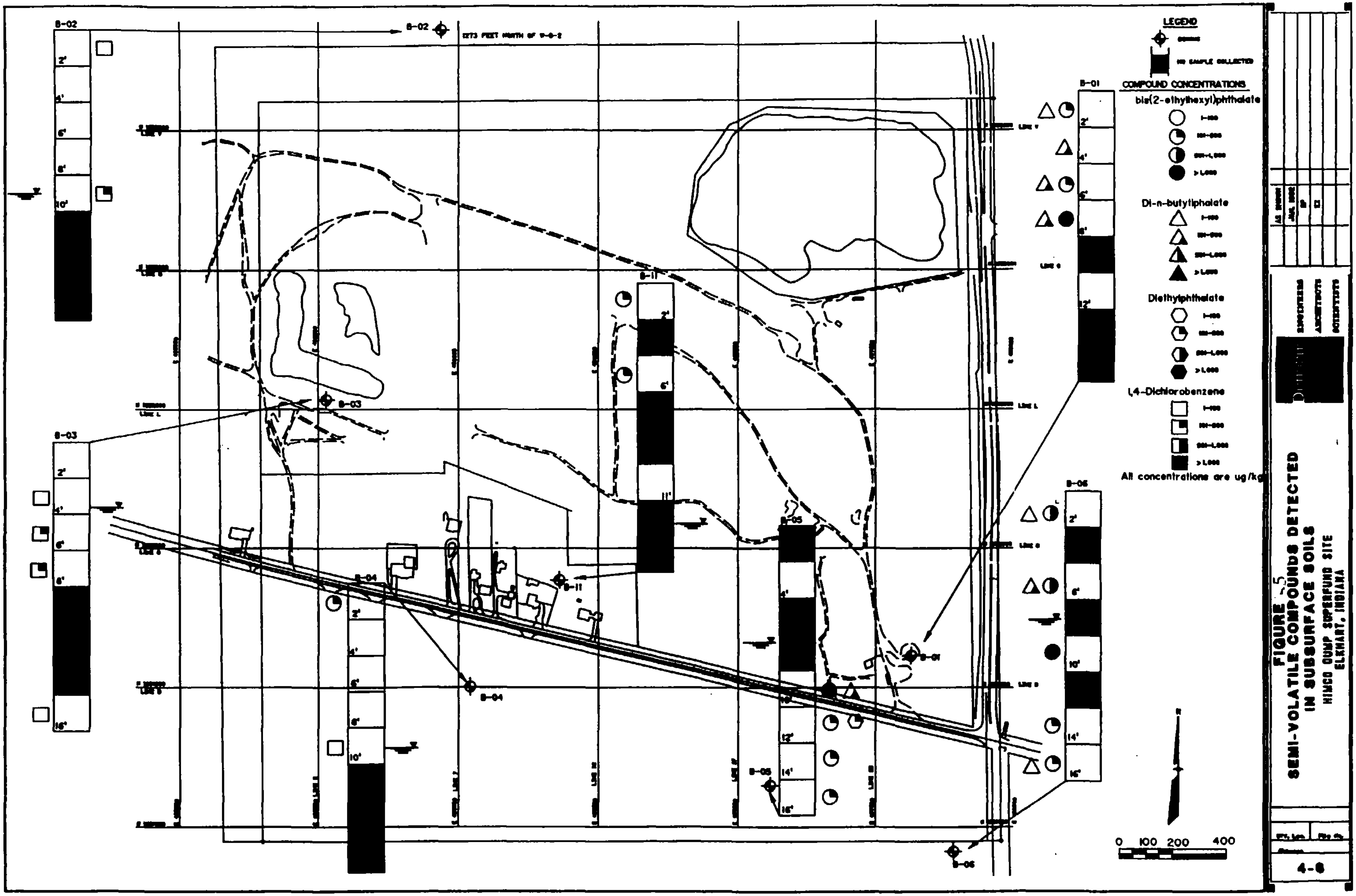
TABLE 3

SUMMARY OF SEMI-VOLATILE COMPOUNDS DETECTED IN SURFACE SOILS
HIMCO DUMP SUPERFUND SITE
ELKHART, INDIANA
1992

Compound	Background * (ug/kg)	Range of Concentrations Detected Above Background (ug/kg)
Naphthalene	ND	18(J)
2-Methylnaphthalene	ND	18(J)
Dimethylphthalate	ND	41(J)
1,4-Dichlorobenzene	80	120(J)-210(J)
Diethylphthalate	80(J)	ND
Benzoic Acid	ND	75(J)
Acenaphthene	ND	59(J)-310(J)
Dibenzofuran	ND	23(J)
Fluorene	ND	43(J)-120(J)
Phenanthrene	ND	42(J)-1,500
Anthracene	ND	82(J)-240(J)
Di-n-butylphthalate	100(J)	92(J)-490(J)
Fluoranthene	ND	17(J)-2,800
Pyrene	ND	34(J)-2,000(J)
Butylbenzylpthalate	ND	300(J)
Benzo(a)anthracene	ND	25(J)-1,300
Chrysene	ND	37(J)-1,600
bis(2-Ethylhexyl)phthalate	93(J)-570(J)	18(J)-7,800(J)
Benzo(b)fluoranthene	ND	67(J)-3,200
Benzo(k)fluoranthene	ND	82(J)-1,700
Benzo(a)pyrene	ND	430(J)-2,200
Indeno(1,2,3-cd)pyrene	ND	230(J)-3,700
Dibenzo(a,h)anthracene	ND	94(J)-550(J)
Benzo(g,h,i)perylene	ND	250(J)-3,500
Carbazole	ND	36(J)
Total Carcinogenic PAHs	ND	138(J)-14,250(J)
Total Non-carcinogenic PAHs	ND	51(J)-8,340(J)

Qualifiers

ND Below detection limit
J - Indicates an estimated value
* - Samples from borings B-02, B-04, and B-06 (0' to 2')



LEGEND
COMPOUND CONCENTRATIONS
bis(2-ethylhexyl)phthalate
Di-n-butylphalate
Diethylphthalate
1,4-Dichlorobenzene
All concentrations are ug/kg
B-01
B-02
B-03
B-04
B-05
B-06
B-11
0 100 200 400
FIGURE 5
SEMI-VOLATILE COMPOUNDS DETECTED IN SUBSURFACE SOILS
HIMCO DUMP SUPERFUND SITE
ELKHART, INDIANA
4-6

The chemicals of potential concern are listed in Table 4.

2. Human Health Effects

The health effects for the contaminants of concern may be found in Volume 5 of the RI.

3. Exposure Assessment

The baseline risk assessment examined potential pathways of concern to human health under both current and future land-use scenarios for the landfill property and surrounding area.

The following pathways were selected for detailed evaluation under current-use conditions:

- Inhalation of airborne particulates or VOCs released from the site (residents northeast of the site and dirt-bike riders on-site),

- Incidental ingestion of surface soil by trespassers while dirt-bike riding,

- Ingestion of surface water and sediment while wading or fishing,

- Dermal contact with surface water while wading.

The following pathways were selected for detailed evaluation under future-use conditions and include future residential, commercial, agricultural, or recreational uses. Future residents and workers were evaluated both on the landfill area and south of the landfill. Agricultural workers were evaluated on the landfill area only. The pathways are:

- Inhalation of airborne particulates or VOCs released from the site, including evaluation to a downwind resident as part of an agricultural future use.

- Incidental ingestion of surface soil,

- Ingestion of groundwater,

- Inhalation of volatiles released during indoor uses of groundwater,

- Dermal exposures to groundwater.

TABLE 4 CHEMICALS OF POTENTIAL CONCERN - HIMCO DUMP SITE

INORGANICS:

Aluminum
Antimony
Arsenic
Barium
Beryllium
Cadmium
Chromium
Cobalt
Iron
Lead
Mercury
Nickel
Silver
Thallium
Vanadium
Cyanide

ORGANICS:

VOLATILES

1,1-Dichloroethane
1,1-Dichloroethene
1,1,1-Trichloroethane
1,2-Dichloroethene
2-Butanone
2-Hexanone
4-methyl-2-pentanone
Acetone
Benzene
Bromodichloromethane
Carbon disulfide
Chlorobenzene
Chloroethane
Chloroform
Ethylbenzene
Methylene chloride
Styrene
Tetrachloroethene
Toluene
Trichloroethene
Vinyl chloride
Xylenes

SEMIVOLATILES

1,4-Dichlorobenzene
2,4-Dimethylphenol
2-Methylnaphthalene
2-Methylphenol
4-Methylphenol
Acenaphthene
Acenaphthylene
Anthracene
Benzo(a)anthracene
Benzo(a)pyrene
Benzo(b)fluoranthene
Benzo(k)fluoranthene
Benzo(g,h,i)perylene
Benzoic Acid
Benzyl alcohol
bis(2-Ethylhexyl) phthalate
Butylbenzylphthalate
Chrysene
Carbazole
Dibenzofuran
Dibenz(a,h)anthracene
Diethylphthalate
Dimethylphthalate
Di-n-butylphthalate
Di-n-octylphthalate
Fluoranthene
Fluorene
Indeno(1,2,3-cd) pyrene
Naphthalene
Phenanthrene
Phenol
Pyrene

PESTICIDES/PCB's

4,4'-DDT
4-4'-DDE
Aldrin
alpha-BHC
alpha-Chlordane
beta-BHC
Dieldrin
Endosulfan II
gamma-Chlordane
Heptachlor
Polychlorinated biphenyl - Aroclor 1248

NON-CLP CHEMICALS:

Bromide, dissolved
Chloride
Nitrogen, ammonia
Nitrogen, nitrate & nitrite
Phosphorus
Sulfate

4. Risk Characterization

For each potential receptor, site-specific contaminants from all relevant routes of exposure were evaluated. Both non-carcinogenic health effects and carcinogenic risks were estimated.

a. Non-Carcinogenic Health Risks

Reference doses (RfDs) have been developed by U.S. EPA for indicating the potential for adverse health effects from exposure to chemicals exhibiting non-carcinogenic effects. RfDs, which are expressed in units of mg/kg-day, are estimates of average daily exposure levels for humans, including sensitive individuals. Estimated intakes of chemicals from environmental media (e.g., the amount of a chemical ingested from contaminated drinking water) can be compared to the RfD. RfDs are derived from human epidemiological studies or animal studies to which uncertainty factors have been applied (e.g., to account for the use of animal data to predict effects on humans). These uncertainty factors help ensure that the RfDs will not underestimate the potential for adverse non-carcinogenic effects to occur.

The Hazard Index (HI), an expression of non-carcinogenic toxic effects, measures whether a person is being exposed to adverse levels of non-carcinogens. The HI provides a useful reference point for gauging the potential significance of multiple contaminant exposures within a single medium or across multiple media. The HI for non-carcinogenic health risks is the sum of all contaminants for a given scenario. Any Hazard Index value greater than 1.0 suggests that a non-carcinogen potentially presents an unacceptable health risk.

b. Carcinogenic Health Risks

Cancer potency factors (CPFs) have been developed by EPA's Carcinogenic Assessment Group for estimating excess lifetime cancer risks associated with exposure to potentially carcinogenic chemicals. CPFs, which are expressed in units of $(mg/kg\text{-}day)^{-1}$, are multiplied by the estimated intake of a potential carcinogen, in mg/kg-day, to provide an upper-bound estimate of the excess lifetime cancer risk associated with exposure at that intake level. The term "upper bound" reflects the conservative estimate of the risks calculated from the CPF. Use of this approach makes underestimation of the actual cancer risk highly unlikely. Cancer potency factors are derived from the results of human epidemiological studies or chronic animal bioassays. The excess lifetime cancer risks are the sum of all excess cancer lifetime risks for all contaminants for a given scenario.

Excess Lifetime Cancer Risks are determined by multiplying the intake level by the cancer potency factor for each contaminant of concern and summing across all relevant chemicals and pathways. These risks are probabilities that are generally expressed in scientific notation (e.g. 1×10^{-6}). An excess lifetime cancer risk of 1×10^{-6} indicates that a person's chance of contracting cancer as a result of site related exposure averaged over a 70-year lifetime may be increased by as much as 1 in one million. The U.S.EPA generally attempts to reduce the excess lifetime cancer risk at Superfund sites to a range of 1×10^{-4} to 1×10^{-6} (1 in 10,000 to 1 in one million), with an emphasis on the lower end (1×10^{-6}) of the scale. Tables 5 and 6 summarize the excess lifetime cancer risks and HI values estimated for the current land-use scenario, respectively. Tables 7 and 8 summarize the excess lifetime cancer risks and HI values estimated for the future land-use scenario respectively, at the Himco Site.

c. Characterization of Lead

The U.S. EPA evaluates noncancer risks from lead by a different method than those described above. The Agency believes that an acceptable approach is to estimate the likely effects of lead exposure on the concentration of lead in the blood. The Uptake/Biokinetic model was used to predict blood lead levels for the scenarios evaluated at this site. The U.S. EPA has identified 10 ug/L of lead in the blood as the level of concern for health effects in children. Of all the scenarios evaluated, there is a cause for concern if the groundwater beneath the landfill is used as a drinking water source.

5. Risk Summary

A major threat is the migration of the plume off-site at detectable levels of concern. Some contamination above MCLs has been found in wells south and southeast of the landfill that either was not found or exceeded levels in background wells and that may be attributable to site contamination.

The potential excess lifetime cancer risk posed by the Site exceeds the acceptable risk range of 1×10^{-4} to 1×10^{-6} principally from the use of contaminated groundwater under the future use scenario. Risks from ingestion, dermal contact and inhalation of volatiles from this groundwater present carcinogenic risks in the range of 1×10^{-1}. South of the landfill, downgradient, the estimated excess cancer

TABLE 5 SUMMARY OF ESTIMATED CARCINOGENIC RISK - CURRENT POPULATIONS

Exposed Population	Exposure Point	Exposure Medium	Exposure Route	Total Excess Cancer Risk
Dirt-bike rider	Site	Soil	Ingestion	2E-06
		Air	Inhalation - Particulates	2E-06
			Inhalation - VOCs	2E-08
			Total	4E-06
Wader	Quarry Pit	Surface Water	Ingestion	1E-08
			Dermal	4E-09
		Sediment	Ingestion	3E-08
			Total	4E-08
Wader	Ponds	Surface Water	Ingestion	1E-08
			Dermal	3E-09
		Sediment	Ingestion	8E-09
			Total	2E-08
Downwind off-site residents:				
Adult	Home	Air	Inhalation - Particulates	1E-07
			- Volatiles	7E-08
			Total	2E-07
Child	Home	Air	Inhalation - Particulates	1E-06
			- Volatiles	2E-06
			Total	3E-06

TABLE 6 SUMMARY OF ESTIMATED CARCINOGENIC RISK - HYPOTHETICAL FUTURE RESIDENTIAL POPULATIONS

Exposed Population	Exposure Point	Exposure Medium	Exposure Route	Total Excess Cancer Risk
Resident On Landfill:				
Adult	Home	Groundwater	Ingestion	1E-01
			Inhalation - VOCs	4E-04
			Dermal	1E-01
		Soil	Ingestion	5E-05
		Air	Inhalation - Particulates	1E-07
			Inhalation - VOCs	8E-07
			Total	2E-01
Child	Home	Groundwater	Ingestion	6E-02
			Inhalation - VOCs	2E-04
			Dermal	6E-01
		Soil	Ingestion	4E-05
		Air	Inhalation - Particulates	1E-07
			Inhalation - VOCs	2E-06
			Total	7E-01
Resident South of Landfill - Shallow Groundwater:				
Adult	Home	Groundwater	Ingestion	4E-03
			Inhalation - VOCs	6E-05
			Dermal	1E-04
		Soil	Ingestion	6E-04
			Total	5E-03
Child	Home	Groundwater	Ingestion	2E-03
			Inhalation - VOCs	4E-05
			Dermal	1E-03
		Soil	Ingestion	4E-04
			Total	3E-03
Resident South of Landfill - Deep Groundwater:				
Adult	Home	Groundwater	Ingestion	4E-03
			Inhalation - VOCs	6E-05
			Dermal	1E-04
		Soil	Ingestion	6E-04
			Total	5E-03
Child	Home	Groundwater	Ingestion	2E-03
			Inhalation - VOCs	3E-05
			Dermal	1E-03
		Soil	Ingestion	4E-04
			Total	3E-03

TABLE 7 SUMMARY OF NONCARCINOGENIC RISK - CURRENT POPULATIONS

Exposed Population	Exposure Point	Exposure Medium	Exposure Route	Hazard Index Subchronic	Hazard Index Chronic
Dirt-bike Rider	Site	Soil	Ingestion	--[(a)]	7E-03
		Air	Inhalation - Particulates	--	2E-01
			Inhalation - VOCs	--	3E-05
			Total	--	2E-01
Wader	Quarry Pit	Surface Water	Ingestion	5E-04	--
			Dermal	4E-04	--
		Sediment	Ingestion	1E-03	--
			Total	2E-03	--
Wader	Ponds	Surface Water	Ingestion	3E-04	--
			Dermal	5E-04	--
		Sediment	Ingestion	2E-04	--
			Total	1E-03	--
Downwind off-site resident:					
Adult	Home	Air	Inhalation - Particulates	--	1E-01
			- Volatiles	--	1E-03
			Total	--	1E-01
Child	Home	Air	Inhalation - Particulates	6E-02	--
			- Volatiles	1E-02	--
			Total	7E-02	--

(a) Exposure not evaluated for this population.

TABLE 8 SUMMARY OF NONCARCINOGENIC RISK - HYPOTHETICAL FUTURE RESIDENTIAL POPULATIONS

Exposed Population	Exposure Point	Exposure Medium	Exposure Route	Hazard Index[(a)]
Resident On Landfill:				
Adult	Home	Groundwater	Ingestion	5E+02
			Inhalation - VOCs	2E+00
			Dermal	2E+01
		Soil	Ingestion	2E-01
		Air	Inhalation - Particulates	1E-02
			Inhalation - VOCs	1E-03
			Total	5E+02
Child	Home	Groundwater	Ingestion	9E+02
			Inhalation - VOCs	4E+00
			Dermal	1E+02
		Soil	Ingestion	8E-01
		Air	Inhalation - Particulates	7E-03
			Inhalation - VOCs	1E-02
			Total	1E+03
Resident South of Landfill - Shallow Groundwater:				
Adult	Home	Groundwater	Ingestion	9E+00
			Inhalation - VOCs	2E-01
			Dermal	8E-01
		Soil	Ingestion	1E-01
			Total	1E+01
Child	Home	Groundwater	Ingestion	2E+01
			Inhalation - VOCs	2E-01
			Dermal	3E+00
		Soil	Ingestion	5E-01
			Total	2E+01
Resident South of Landfill - Deep Groundwater:				
Adult	Home	Groundwater	Ingestion	4E+00
			Inhalation - VOCs	2E-01
			Dermal	9E-01
		Soil	Ingestion	1E-01
			Total	5E+00
Child	Home	Groundwater	Ingestion	9E+00
			Inhalation - VOCs	2E-01
			Dermal	4E+00
		Soil	Ingestion	5E-01
			Total	1E+01

(a) Hazard index is subchronic for child populations and chronic for all others.

risks to a future resident are approximately 5 X 10^{-3}. The hazard index for humans interacting with the Site exceed the acceptable hazard index of 1.0. For future use of the groundwater under the landfill, the hazard index values are approximately 500 to 1,000.

Some of these risks are caused in some part by chemicals which could be present at levels close to levels found in background wells (that is, wells located upgradient of the site). These chemicals include arsenic, antimony and beryllium. The sampling results do not clearly indicate whether or not the site is actually contributing more of these chemicals to the groundwater; however, even if the risks due to these possible background chemicals were not included in the risk estimates, there still are risks from other chemicals that indicate the groundwater beneath the landfill should not be used as a drinking water source.

In addition to groundwater, there is an estimated excess cancer risk of 4 to 6 X 10^{-4} to a future resident living south of the landfill where Polynuclear Aromatic Hydrocarbons (PAHs) were detected in the soil.

6. Environmental Risks

An ecological risk assessment was conducted to characterize the biological resources at the site and adjacent habitats, and identify actual and potential impacts to these resources associated with releases of hazardous substances from the site.

Contaminants present in the soil where the prairie communities are located are unlikely to pose adverse impacts to resident species of plants and animals. The greatest hazard to resident organisms occurs in the south/southeast area of the site where contamination is higher and more varied. This area is highly disturbed and unlikely to support ecologically significant populations. Small mammals are likely to inhabit this area and may be exposed to contaminants. Other areas of the site are unlikely to pose a significant threat of adverse effects to exposed organisms. The potential exposures of ecological concern are summarized in Table 9.

G. RATIONALE FOR FURTHER ACTION

Actual or threatened releases of hazardous substances from this Site, if not addressed by implementation of the response action selected by this ROD, may present an imminent and substantial endangerment to public health, welfare, or the environment. Therefore, based on the findings in the RI report and the

TABLE 9

EXPOSURE SCENARIOS FOR ECOLOGICAL POPULATIONS
HIMCO DUMP SUPERFUND SITE
ELKHART, INDIANA
1992

Exposure Point	Exposed Population	Exposure Activity	Relative Potential Magnitude of Exposure
L-Pond, Small Pond and Quarry Pond	Benthic invertebrates	Direct uptake, feeding	High
	Fish	Direct uptake, feeding	High
	Phytoplankton	Direct uptake	High
	Zooplankton	Direct uptake, feeding	High
	Resident shorebirds	Ingestion of water, soil, and sediment; feeding	Low to Moderate
	Migratory waterfowl	Ingestion of water, soil, and sediment; feeding	Very Low
	Terrestrial wildlife (including avian)	Ingestion of water, soil, and sediment; feeding	Low to Moderate
	Aquatic macrophytes	Direct uptake	High
	Aquatic organisms exposed to runoff from watershed	Direct uptake, feeding	Low to Moderate
Terrestrial Locations	Terrestrial plants	Growth in contaminated soil; uptake	High
	Terrestrial invertebrates and wildlife (including burrowing animals, soil invertebrates, avian predators, e.g., eagles)	Ingestion of contaminated water and soil; direct contact with contaminated soil; consumption of contaminated plants and animals	Very Low to High
Wetland	Wetland vegetation exposed to runoff and contaminated soil	Direct uptake	Moderate to High

discussion above, a Feasibility Study (FS) was performed to focus on the development of alternatives to address the threats at the Site. The FS report documents the evaluation of the magnitude of site risks, site-specific applicable or relevant and appropriate requirements, and the requirements of CERCLA and the NCP in the derivation of remedial alternatives for the Site.

H. DESCRIPTION OF ALTERNATIVES

Although the NCP reaffirms U.S. EPA's preference for permanent solutions to Superfund site problems through the use of treatment technologies, the preamble to the NCP contemplates that many remedial alternatives may be impractical for certain sites due to severe implementability problems or prohibitive costs (e.g., treatment of the entire contents of a large landfill). Since the Himco Site contains a 58 acre landfill, U.S. EPA believes that treatment of the landfill contents is impracticable because of severe implementability problems, danger to workers and nearby residents, and prohibitive costs; therefore, the FS was directed at the evaluation of containment rather than treatment of the source material. Source control alternatives range from no action to capping with leachate collection and treatment.

Because the target risk level of one in 10,000 (1 X 10 $^{-4}$ for carcinogenic risk and HI of 1 for noncarcinogenic risk) is currently exceeded in background groundwater samples, the NCP target risk levels cannot be specified for the groundwater downgradient of the Himco Site. Additionally, RI data do not conclusively indicate that groundwater outside the boundaries of the contaminated areas is currently being impacted by the site contaminants; therefore, at this time a groundwater remedy and cleanup standards have not been developed for this Site.

A groundwater monitoring program is a component of each alternative except the no action alternative. Groundwater monitoring has been incorporated in the alternatives to evaluate the effectiveness of the remedy. The FS has established contamination levels for contaminants of concern which would trigger an additional groundwater investigation if the remedy fails and those levels are reached.

All caps would be designed to minimize any adverse impact to the wetland, delineated during the RI.

Alternative 1 - No Action

The NCP requires that a No Action alternative be evaluated at every site to serve as a baseline for comparison against the other cleanup alternatives. It assumes that no corrective action will be taken at the site. It has no cost or operation and maintenance associated with it. It does not provide any long-term effectiveness and permanence; nor does it provide a reduction of toxicity, mobility, or volume through treatment.

Alternative 2 - Containment by Means of a Solid Waste Cap; Active Landfill Gas Collection and Treatment; Groundwater Monitoring; and Institutional Controls

Alternative 2 includes a single barrier, solid waste cap to contain the landfill waste mass and the contaminated surface soil in the construction debris area and in an area immediately south of the landfill, and an active landfill gas collection and treatment system with vapor phase carbon adsorption. A groundwater monitoring program will be implemented and institutional controls will be placed on the site by means of fencing, access restrictions, deed restrictions, and groundwater use restrictions. The primary components of this alternative include the following:

Cap Construction

The entire landfill waste mass and the contaminated surface soil in the construction debris area and in the area immediately south of the landfill will be capped. Site preparation and layout will be completed to re-route surface water drainage away from the capped area. The cap will consist of an 18-inch vegetated soil layer, a 6-inch sand drainage layer, and a 2-foot thick, low permeability clay layer. The vegetative soil layer will be seeded, if possible, with the current on-site plant species to preserve the uniqueness of the prairie assemblage at this site. An additional layer of soil (buffer) of approximately 2.15 feet will be laid over the existing landfill to attain a 4 percent grade required by the State of Indiana and to facilitate drainage.

Groundwater Monitoring

A groundwater monitoring program will be implemented to monitor groundwater quality downgradient of the site and to evaluate if the remedy is effective in protecting the site groundwater from adverse impacts by site contaminants.

Landfill Gas

An active landfill gas collection system will be located in a grid network throughout the landfill. The off-gas from the landfill will be treated by means of a vapor phase carbon system if landfill gas characterization studies indicate VOC emissions exceed ARARs. The spent carbon would be tested by TCLP to determine if it is hazardous by characteristic, and then managed accordingly. If any methane gas is generated, creating explosive conditions, an enclosed ground flare system will be implemented to burn it.

Institutional Controls

Institutional controls will be implemented, which include installation of a fence around the landfill and contaminated soils covered by the cap; and deed restrictions limiting the site's future land use as well as restrictions on groundwater use in the site vicinity.

The estimated costs for this alternative are:

Capital Cost: $7,539,000
Annual O&M Cost: $210,000
Total Present Worth: $10,429,000

Alternative 3 - Containment by Means of a Single Barrier, Solid Waste Cap; Active Landfill Gas Collection and Treatment; Leachate Collection and Off-Site TSDF Disposal; Groundwater Monitoring; and Institutional Controls

Alternative 3 is the same as Alternative 2 with the addition of a leachate collection system and off-site disposal.

Leachate Collection System

A leachate collection system, consisting of vertical wells placed in the landfill to extract leachate generated in the landfill, will be constructed. Six hundred eighty wells, spaced 56 feet apart will be installed in the landfill. The collected leachate will be transported by means of an interconnecting piping system to a central collection point, then transported for treatment and disposal to a licensed, treatment, storage and disposal (TSDF) facility. Compliance with Indiana State Codes regulating disposal of wastewater would be required.

Capital Cost: $13,628,000
Annual O&M Cost: $982,000
Total Present Worth: $27,140,000

Alternative 4 - Containment by Means of a Composite Barrier, Solid Waste Cap; Active Collection and Treatment of Landfill Gas; Groundwater Monitoring; and Institutional Controls

This alternative is similar to alternative 2, except the cap is a composite barrier, solid waste cap. The cap structure is the same as alternative 2 except that upon the 2-foot clay layer and under the 6-inch sand drainage layer, there will be a 40 millimeter, high density polyethylene (HDPE) flexible membrane liner. The composite cap provides an added level of landfill gas containment and greater control of infiltration into the waste mass, over the single barrier cap. The composite cap greatly reduces the need for a leachate collection system.

Capital Cost: $8,931,000
Annual O&M Cost: $210,000
Total Present Worth: $11,821,000

I. <u>Summary of Comparative Analysis of Alternatives</u>

In accordance with the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), the relative performance of each alternative is evaluated using the nine criteria, Title 40 of the Code Federal Regulations (40 CFR) Section 300.430(e) (9) (iii), as a basis for comparison. An alternative providing the "best balance" of trade-offs with respect to the nine criteria is determined from this evaluation.

The following two threshold criteria, overall protection of human health and the environment, and compliance with Applicable or Relevant and Appropriate Requirements (ARARs) are criteria that must be met in order for an alternative to be selected.

1. Overall Protection of Human Health and the Environment

Overall protection of human health and the environment addresses whether a remedy eliminates, reduces, or controls threats to human health and to the environment.

The major exposure pathways of concern at the Site are from ingestion, inhalation, and direct contact with the landfill waste mass and contaminated soils in the construction debris area. The continued release of leachate into the groundwater aquifer and outside the landfill boundaries also presents a risk to human health and the environment. Environmental risk may result from the release of landfill fugitive dust into the air.

Alternative 1 does not satisfy the requirement for overall protection of human health and the environment. Alternatives 2 and 3 provide protection to human health and the environment by reducing risk by containing the landfill waste mass, and the contaminated surface soil in the construction debris area and in an area immediately south of the landfill, with a single barrier, solid waste cap and by collecting and treating the landfill gas. With these alternatives, human risk associated with exposure to the wastes in the landfill and the contaminated surface soil in the construction debris area and in an area immediately south of the landfill is theoretically eliminated. Additionally, risk associated with release of the leachate into the groundwater or outside the landfill boundaries is reduced.

Alternative 3 provides further reduction of risk with the extraction and off-site treatment and disposal of leachate from the landfill. This reduces the potential for release of contaminants into groundwater or other media outside the landfill boundaries. Alternative 4 provides a greater reduction in risk than Alternatives 2 and 3 because the composite cap provides an added level of landfill gas containment and greater control of infiltration into the waste mass, over the single barrier cap, thereby minimizing the potential release of leachate into the groundwater and other media outside of the landfill boundaries (the composite cap greatly reduces the need for a leachate collection system).

2. Compliance with Applicable or Relevant and Appropriate Requirements

This criterion evaluates whether an alternative meets ARARs set forth in federal, or more stringent state, environmental standards pertaining to the site or proposed actions.

Because the No Action alternative does not involve conducting any remedial action at the site, no ARARs analysis is necessary for Alternative 1. Alternatives 2, 3, and 4 are expected to be in compliance with ARARs.

3. Long-Term Effectiveness and Permanence

This criterion refers to the ability of an alternative to maintain reliable protection of human health and the environment over time. The primary focus of this evaluation is the extent and effectiveness of controls that may be required to manage the risk posed by treatment residuals and/or untreated waste.

Alternative 1, the No Action alternative, provides no long-term effectiveness and would result in continuation of the elevated risk levels that currently exist at the Himco site.

Alternatives 2 and 3 provide long-term effectiveness and permanence by containing the landfill waste mass, and the contaminated surface soil in the construction debris area and in an area immediately south of the landfill, with a single barrier, solid waste cap. The cap will reduce ingestion, inhalation, and direct contact with contaminated materials and will reduce infiltration of precipitation into the waste mass which reduces leachate generation, thereby reducing the potential for off-site groundwater contamination. Alternative 3 further reduces risk with the leachate collection system; however, because groundwater is hydraulically connected with the landfill waste, there is uncertainty as to the effectiveness of collecting the leachate. Alternatives 2 and 3 also provide long-term effectiveness and permanence by implementing institutional controls to maintain the cap's integrity and restrict groundwater use in the site vicinity.

Alternative 4, like Alternatives 2 and 3, provides long-term effectiveness and permanence through containment and reduction of infiltration and by implementing institutional controls to maintain the cap's integrity, as well as to restrict groundwater use in the site vicinity. The composite barrier solid waste cap in Alternative 4 further reduces infiltration, which reduces the generation of leachate, thereby providing a greater reduction in risk and in the potential for off-site groundwater contamination.

4. Reduction of Toxicity, Mobility, or Volume through Treatment

This criterion evaluates treatment technology performance in the reduction of chemical toxicity, mobility, or volume. This criterion addresses the statutory preference for selecting remedial actions which include, as a principal element, treatment that permanently and significantly reduces the volume, toxicity, or mobility of the hazardous substances, pollutants, and contaminants.

Alternative 1 provides no reduction in toxicity, mobility, or volume. Alternatives 2 through 4 provide a slight reduction in toxicity or volume in VOCs from landfill gas collection. Alternative 3 provides an added marginal reduction in toxicity and volume through the leachate collection. Alternatives 2, 3, and 4 provide reduction in mobility by reducing leachate generation in the landfill. The liner system in Alternative 4 provides a greater reduction in the leachate generation rate than that in Alternatives 2 and 3, further reducing mobility of contaminants in the landfill.

5. Short-Term Effectiveness

Short-term effectiveness considers the time to reach cleanup objectives and the risks an alternative may pose to site workers, the community, and the environment during remedy implementation until cleanup goals are achieved.

Potential risks from Alternatives 2, 3 and 4 to the community during implementation are from exposure to airborne dust and organic vapors from the waste mass and leachate. Workers employed in the construction of the gas collection system, the leachate collection system and the cap may be exposed to the waste mass and leachate material. All the alternatives, except Alternative 1, include measures to minimize the short-term impacts during construction, such as dust control and the use of safe work practices.

HIMCO DUMP

RESPONSIVENESS SUMMARY

This Responsiveness Summary has been prepared to meet the requirements of Sections 113(k)(2)(iv) and 117(b) of the Comprehensive Environmental Response, Compensation and Liability Act of 1980, as amended by the Superfund Amendments and Reauthorization Act of 1986 (CERCLA), which requires the United States Environmental Protection Agency (U.S. EPA) to respond "...to each of the significant comments, criticisms, and new data submitted in written or oral presentations" on a proposed plan for a remedial action. The Responsiveness Summary addresses concerns expressed by the public, potentially responsible parties (PRPs), and governmental bodies in written and oral comments received by U.S. EPA and the State of Indiana regarding the proposed remedy for the Himco Dump Site.

Overview

The Himco Dump site is a closed landfill located at County Road 10 and the Nappanee Street Extension in Cleveland Township, adjacent to the City of Elkhart, Elkhart County, Indiana. The site is located approximately two miles north of the St. Joseph River which runs east-west through the City of Elkhart. The site covers approximately 100 acres and is bounded on the north by a tree line and a gravel pit pond; on the west by two ponds (an L shaped pond called the "L" pond, and the small pond); on the south by County Road 10 and private residences; and on the east by Nappanee Street Extension.

There is an abandoned gravel pit operation in the northeast corner of the site. An old truck scale and concrete structures are also present in this area. The gravel pit is filled with water which is approximately 30 feet deep. Two smaller and shallower ponds, the L pond and the small pond, are on the west side of the site.

The Himco site was privately operated by Himco Waste Away Service, Inc., and was in operation between 1960 and September 1976. In 1971, the Indiana State Board of Health (ISBH) first identified the Himco site as an open dump. In early 1974, residents along County Road 10 south of the Himco site complained to ISBH about color, taste, and odor problems with their shallow wells. Analyses of six shallow wells along County Road 10, ranging in depth from 20 to 30 feet, showed high levels of manganese. Mr. Chuck Himes, the principal landfill operator, replaced these wells with deeper wells ranging in depth from 152 to 172 feet below ground surface. By mid-1990, the wells showed high concentrations of sodium which posed a chronic health threat to the residents. By November 1990, municipal water service was provided to those residents whose wells were affected and was financed by Miles Laboratories, Inc. and Himco Waste Service, Inc. In 1976, the landfill was closed.

In June 1988, the Himco site was proposed for the National Priorities List (NPL) and in February 1990, was officially placed on the NPL and designated a Superfund site. The site RI/FS was begun in 1989 and completed in 1992.

Public Comment Period

A public comment period on the FS and Proposed Plan for this Site was initiated on September 30, 1992 and was originally scheduled to run for 30 days. However, the Agency received requests from Potentially Responsible Parties to extend the comment period, so in response to these requests, the comment period was extended through November 30, 1992. A public meeting was held on October 6, 1992 at the Municipal Building in Elkhart, Indiana. At this meeting, representatives from U.S. EPA and IDEM presented the Proposed Plan, answered questions, and accepted comments from the public. Approximately 60 people were in attendance. Comments received during the comment period are included in this Responsiveness Summary.

The RI Report, the FS and the Proposed Plan for the Site were made available to the public on September 30, 1992. These documents are available in both the administrative record and information repositories maintained at U.S. EPA offices in Chicago, Illinois, the Elkhart Public Library and the Pierre Moran Branch Library in Elkhart, Indiana.

Summary of Comments

The public comments regarding the Himco Dump Site are organized into the following two categories:

- Summary of comments from local residents regarding the FS and the Proposed Plan;

- Summary of comments from the PRPs concerning the FS and the Proposed Plan.

Many of the comments below have been paraphrased in order to effectively summarize them in this document. The reader is referred to the Administrative Record for this Site, located at U.S. EPA offices in Chicago, Illinois and the Elkhart Public and Pierre Moran Branch Libraries in Elkhart, Indiana. The Administrative Record also contains a copy of the public meeting transcript.

Comments from Residents of the Community Affected by the Landfill

Comment: The majority of comments from the affected community thank U.S. EPA for conducting the study. They want the site cleaned without any more delays. Some of the comments support our remedy; however, most of the comments reflect the community's desire to excavate the landfill and avoid a "cover-up" remedy. In addition, all but one comment from the community want the leachate pumped and treated.

Response: It would be impractical to excavate the entire landfill. The material would need to be treated in some way which would be extremely expensive. After treatment, the residual material would then need to be landfilled.

The leachate collection system was not recommended because, due to the fact that the groundwater is hydraulically connected with the landfill waste, and it is unlikely that the leachate wells would effectively collect the leachate. In addition, 680 extraction wells would need operation and maintenance and the system would require perpetual pumping, treatment and disposal, at substantial cost.

Comment: The proposed cap will not stop vertical infiltration. What will happen when rain and snow melt is dumped on uncovered areas?

Response: The cap will greatly reduce vertical infiltration. The composite liner provides an added layer of protection, further minimizing infiltration into the landfill. The new cap will prevent rain and snow melt from coming in contact with any contaminated material and therefore, will not carry contamination to uncovered areas.

Comment: The groundwater is being contaminated by the landfill.

Response: The RI shows the site is not currently impacting the groundwater near the landfill. To insure the quality of the groundwater, a groundwater monitoring plan will be developed during the design. As part of this plan, the Agency will set trigger levels for contaminants of concern (contaminants identified in the RI). If the monitoring results show that these levels are being exceeded, a ground water study will be initiated to further evaluate the site conditions and identify the potential remedy if required. The Maximum Contaminant Levels (MCLs) established for drinking water are proposed as the trigger levels for most of the contaminants of concern. Levels for the remaining contaminants of concern (antimony, lead, vanadium, and methylene chloride) are calculated based on concentrations found in background wells, using a formula developed for monitoring at RCRA facilities (Statistical Analysis of Ground Water Monitoring

Data at RCRA Facilities, Interim Final Guidance, April 1989). A more extensive discussion of the method of determining the trigger levels may be found in Appendix A of the FS Report.

Comment: Deed restrictions are worthless. Deed restrictions can be eliminated any time in the future if the present owners, heirs, or powers of attorney so elect to do.

Response:

Institutional controls (such as deed restrictions) can be used (and typically are used) in conjunction with engineering controls as part of a remedial action in order to ensure protection of human health and the environment. Although it is true that at this site institutional controls, including deed restrictions to limit land and groundwater use, cannot by themselves be relied upon to protect public health, they do impose a legal obligation upon the owner of the property or future purchasers to abide by the restrictions. If the Agency negotiates a Consent Decree with Defendants which own Superfund Site property and deed restrictions are required by that Consent Decree, the deed restrictions become legally enforcable. Therefore the Agency believes that requiring deed restrictions, to prevent future development of the Site or any consumptive use of the groundwater, will enhance the protectiveness of the remedy. In the event that deed restrictions are not implemented, and another institutional control is necessary to ensure protectiveness, EPA will consider such measures at that time.

Comment: Almost every comment from the affected community was adamant in having the Potentially Responsibility Parties (PRPs) pay for the clean-up.

Response: U.S. EPA has an enforcement first policy and will negotiate with the PRPs at this site to conduct the clean-up. However, if no good faith offer to conduct and/or finance the remedy is received from the PRPs, U.S. EPA will consider other options.

Comments from the Potentially Responsibility Parties

INTRODUCTORY STATEMENT:

Comments were received from several PRPs and/or their contractors. Three provided extensive comments, while the others provided letters supporting the comments of others. All PRP commentors recommended a no action alternative. To support this recommendation, they offered a number of comments in regard to the preparation of the risk assessment for the Himco site. These comments challenged the Agency's approach, exposure assumptions

6. Implementability

This criterion addresses the technical and administrative feasibility of implementing an alternative, and the availability of various services and materials required for its implementation.

All the alternatives are implementable and can be readily constructed with technology and materials presently available. The composite barrier cap in Alternative 4 will take a little more time for installation than the single barrier cap in Alternatives 2 and 3. Operation of Alternative 3 will be more difficult because it includes a leachate collection and storage system and requires periodic disposal of leachate at an off-site TSDF.

7. Cost

This criterion compares the capital, O&M, and present worth costs of implementing the alternatives at the Site. Table 10 shows the Cost Summary.

8. State Acceptance

The State of Indiana is in agreement with the selection of Alternative 4 for remediation of the Himco Dump Site and has provided U.S. EPA with a letter of concurrence.

9. Community Acceptance

Community concerns have been thoroughly reviewed and are addressed in the attached Responsiveness Summary.

J. The Selected Remedy

Based upon considerations of the requirements of CERCLA, the NCP and balancing of the nine criteria, the U.S. EPA has determined that Alternative 4, a Composite Barrier, Solid Waste Cap; Active Collection and Treatment of Landfill Gas; Groundwater Monitoring; and Institutional Controls, is the most appropriate remedy for the Himco Dump Site.

The components of the selected remedy are as follows:

- A composite barrier, solid waste cap with an area equal to approximately 58 acres,consisting of: an 18-inch vegetated soil layer; a 6-inch sand drainage layer; a 40 millimeter, high density polyethylene (HDPE) flexible membrane liner; a 2-foot thick, low permeability clay layer and an additional layer of soil (buffer) of approximately 2.15 feet laid over the existing landfill to attain the State of Indiana

TABLE 10

COST SUMMARY

Himco Dump Superfund Site

Elkhart, Indiana

Alternatives	Capital Cost	Annual O&M Cost	Total Present Worth Cost*
1. No Action	$0	$0	$0
2. Single Barrier Cap, Gas Collection & Treatment, Groundwater Monitoring, & Institutional Control	$7,539,000	$210,000	$10,429,000
3. Single Barrier Cap, Gas Collection & Treatment, Leachate Collection System, Groundwater Monitoring, & Institutional Control	$13,628,000	$982,000	$27,140,000
4. Composite Barrier Cap, Gas Collection & Treatment, Groundwater Monitoring, & Institutional Control	$8,931,000	$210,000	$11,821,000

* Present worth cost based on interest(i)=6% and 30 years for O&M (see Tables 4–1 through 4–4).

required 4 percent grade and to facilitate drainage.

- Institutional controls including fencing, deed restrictions limiting the land use of the site, and groundwater use restrictions.

- An active landfill gas collection system including a vapor phase carbon system to treat the off-gas from the landfill.

  An enclosed ground flare system will be implemented if landfill gas characterization studies indicate VOC emissions exceed ARARs.

- A groundwater monitoring program designed to detect changes in concentration of hazardous constituents in the groundwater and to detect the presence and concentration of site related contamination in drinking water wells near the Site.

  The groundwater monitoring program shall continue for 30 years. Samples shall be analyzed for target compound list (TCL), VOCs and target analyte list (TAL) metals.

- Mitigative measures will be taken during remedy construction activities to minimize adverse impacts to the wetland.

K. Statutory Determinations

U.S. EPA's primary responsibility at Superfund Sites is to undertake remedial actions that protect human health and the environment. Section 121 of CERCLA has established several other statutory requirements and preferences. These include the requirement that the selected remedy, when completed, must comply with all applicable, relevant and appropriate requirements ("ARARs") imposed by Federal and State environmental laws, unless the invocation of a waiver is justified. The selected remedy must also provide overall effectiveness appropriate to its costs, and use permanent solutions and alternative treatment technologies, or resource recovery technologies, to the maximum extent practicable. Finally, the statute establishes a preference for remedies which employ treatment that significantly reduces the toxicity, mobility or volume of contaminants.

The selected remedy will satisfy the statutory requirements established in Section 121 of CERCLA, as amended by SARA, to protect human health and the environment, will comply with ARARs (or provide grounds for invoking a waiver), will provide overall effectiveness appropriate to its costs, and will use permanent solutions and alternate treatment technologies to the maximum extent practicable. Treatment is not a component of the selected remedy because an attempt to treat the hazardous substances present at the site in soils and leachate would not provide a sufficiently significant additional decrease in risk presented by the site to justify the increased cost of attempting such treatment.

1. Protection of Human Health and the Environment

Implementation of the selected remedy will protect human health and the environment by reducing the risk of exposure to hazardous substances present in surface soils and leachate at the site. An adequate final cover for the site will reduce the risk of exposure to hazardous substances present in soil at the site, and will also reduce the rate of infiltration by which precipitation passes through the contaminated soil and maintain that reduction over time. By reducing the rate of infiltration, the final cover will also reduce the rate of leachate generation in the landfill; therefore, the final cover will also reduce the risk that hazardous substances, pollutants, and contaminants present in the leachate will migrate and contaminate the aquifer. Groundwater monitoring will be required to provide early warning against the risk that the hazardous substances present in the leachate may migrate and contaminate the aquifer. Institutional controls will be imposed to restrict uses of the site to prevent exposure to hazardous substances and contaminants in the soil and the leachate at the site. No unacceptable short-term risks will be caused by implementation of the remedy. The community and site workers may be exposed to dust and noise nuisances during construction of the final cover. Mitigative measures will be taken during remedy construction activities to minimize impacts of construction upon the surrounding community and environs. Ambient air monitoring will be conducted and appropriate safety measures will be taken if contaminants are emitted.

2. Compliance with ARARs

The selected remedy will comply with all identified applicable or relevant and appropriate federal requirements, and with those state requirements which are more stringent, unless a waiver is invoked pursuant to Section 121(d)(4)(B) of CERCLA. The ARARs for the selected remedy are listed below:

A. Federal ARARs

<u>Chemical-Specific Requirements</u>

Chemical-specific ARARs regulate the release to the environment of specific substances having certain chemical characteristics. Chemical-specific ARARs typically determine the standard for clean-up at a site.

Resource Conservation and Recovery Act (RCRA)

As the hazardous wastes at this site were placed prior to the effective date of the regulations, the chemical-specific requirements of RCRA are not applicable. As the leachate from the waste mass is highly contaminated by hazardous substances similar to RCRA hazardous substances, the chemical-specific requirements of RCRA are relevant and appropriate. 40 CFR 141 requires that ground water used as drinking water meet Maximum Contaminant Levels ("MCLs") for contaminants of concern.

Safe Drinking Water Act

40 CFR 141

Federal Drinking Water Standards promulgated under the Safe Drinking Water Act ("SDWA") include both Maximum Contaminant Levels ("MCLs") and, to a certain extent, non-zero Maximum Contaminant Level Goals ("MCLGs"), that are applicable to municipal drinking water supplies servicing 25 or more people. At the Himco Dump Site, MCLs and MCLGs are not applicable, but are relevant and appropriate, because the unconfined aquifer below the site is a Class II aquifer which has been used by residences bordering the site, is presently being used by residences in the area surrounding the site and could potentially be used in the future as a drinking water source.

The National Contingency Plan ("NCP") at 40 CFR 300.430 (e) (2) (i) (B) provides that MCLGs established under the Safe Drinking Water Act that are set at levels above zero, shall be attained by remedial actions for ground waters that are current or potential sources of drinking water. The point of compliance for federal drinking water standards is at the boundary of the solidified/stabilized waste, because this is the point where humans could potentially be exposed to contaminated groundwater. Because this site will have a final clay cover, the point of compliance will be at the boundary of the final cover. Ground water monitoring wells will be installed at the point of compliance to ensure that any release of contaminated leachate from the site which could adversely affect the aquifer is detected at the earliest possible stage. Existing ground water wells in the aquifer will also be monitored, and additional wells may be drilled and monitored, if necessary.

Location-Specific Requirements

Location-specific ARARs are those requirements that derive from the physical nature of the site's location and features of the local geology and hydrogeology such as wetlands and floodplains.

Resource Conservation and Recovery Act ("RCRA")

Executive Orders 11988 11990, 40 CFR Part 6, Appendix A

Since the RI has identified wetlands adjacent to the site, the action must be carried out in such a way as to prohibit discharge of dredged or fill material into wetlands without a permit, avoid adverse effects, minimize potential harm, and preserve and enhance wetlands, to the extent possible. Executive Order 11990 (Protection of Wetlands) is an applicable requirement. Executive Order 11990 requires that actions taken at the Site be conducted in a manner minimizing the potential for destruction, loss, or degradation of wetlands.

Wetlands will be monitored and evaluated. ARARs for wetlands will be met through the continued evaluation of the wetlands, and if necessary, implementation of a plan to limit degradation, or restore the wetlands.

Action-Specific Requirements

Resource Conservation and Recovery Act ("RCRA")

Landfills

40 CFR 264.310

This regulation requires the installation of a final cover to provide long-term minimization of infiltration. This regulation also requires 30-year post-closure care and ground-water monitoring. The Regional Administrator may revise the length of post-closure care period pursuant to 40 CFR 264.117(a)(2)(i) if he finds that a reduced period is sufficient to protect human health and the environment; or extend the length of the post-closure care period pursuant to 40 CFR 264.117(a)(2)(ii) if he finds that the extended period is necessary to protect human health and the environment.

Although the hazardous waste in this landfill was placed before the effective date of the requirements, and therefore, this regulation is not applicable; it is nevertheless clearly appropriate in light of the wastes similar or identical in chemical structure to RCRA hazardous wastes that pose the threats which this action will be designed to address. This regulation establishes standards for the final cover and requires compliance with the regulations which govern post closure care set forth at 40 CFR 264.117-120.

Post Closure Care

40 CFR 264.117(a)(1)

While the requirements for post closure care set forth at 40 CFR 262.117 through 264.120 are not applicable to this site, the presence of hazardous substances similar to RCRA hazardous wastes in the dump make several of these regulations relevant and appropriate. This includes the requirement for maintenance and monitoring of the waste containment systems for thirty years.

40 CFR 264.117(c)

The remedy selected for this site requires U.S. EPA to restrict post-closure use of this property as necessary to prevent damage to the cover. Post closure use of the property must never be allowed to disturb the integrity of the cover, the liner, or any other component of the containment system, or the function of the facility's monitoring systems, unless the Regional Administrator finds that the disturbance is necessary to the proposed use of the property and will not increase the potential hazard to human health and the environment, or the disturbance is necessary to reduce a threat to human health and the environment

40 CFR 264.228(b)
40 CFR 264.310(b)

It will be necessary to prevent run-on and run-off from damaging the cover.

Closure with Waste in Place

40 CFR 264.228(a)(2)
40 CFR 264.258(b)

These regulations require the elimination of free liquids by removal or solidification, and the stabilization of remaining waste and waste residue to support cover. Because the RCRA hazardous waste in this landfill was placed before the effective date of the regulations, they are not applicable, but may be considered relevant and appropriate.

Clean Air Act

40 CFR 50 and 52

The Clean Air Act and the regulations cited above require that select types and quantities of air emissions be in compliance with regional air pollution control programs, approved State Implementation Plans ("SIP"s) and other appropriate federal air criteria. The selected remedy involves installation of a gas collection system which may release contaminants or particulates into the air. Emission and technology requirements promulgated under this act are relevant and appropriate, including provisions of the State of Indiana's SIP.

B. State ARARs as Identified by the State of Indiana

- Wetlands Protection through the State of Indiana Water Quality Surveillance Standards Branch and the Indiana DNR Division of Water Requirements

- Ambient Air Quality Standards (Title 326 IAC Article 1-3)

- Indiana VOC Emission Standards (Title 326 IAC Article 2-1 and 8-1-6)

- Indiana fugitive dust control (Title 326 IAC Article 6-4)

- Indiana Solid Waste Landfill Cover Standards (Title 329 IAC Articles 2-4, 2-14, 2-15 and 3.1-9

- Indiana Solid and Hazardous Waste Management (Title 329 IAC Article 2-21)

The remedy will attain the state standards listed above to the extent that such standards are applicable, or relevant and appropriate, promulgated standards more stringent than the comparable federal standard.

3. Cost Effectiveness

Cost effectiveness compares the effectiveness of an alternative in proportion to its cost of providing environmental benefits. Table 11 lists the costs associated with the implementation of the selected remedy.

TABLE 11

Total estimated costs for the selected remedy at the Himco Dump Site:

Alternative	Total Capital Cost	Total O&M, 30 Yr.	Total Present Worth
4	$8,931,000	$2,890,000	$11,821,000

The selected remedy for this site is cost effective because it provides the greatest overall effectiveness proportionate to its costs when compared to the other alternatives evaluated, the net present worth being $11,821,000. The estimated cost of the selected remedy is comparable with Alternatives 2 and 3, and assures a high degree of certainty that the remedy will be effective in the long-term due to the significant reduction of the mobility of the contaminants achieved through containment of the source material and the decrease in leachate generation. The addition of a leachate collection system would provide only a limited additional reduction of risk to public health and the environment. The uncertain effectiveness of such a system, which would be very difficult to implement, does not justify the additional cost for this component.

4. **Utilization of Permanent Solutions and Alternative Treatment Technologies or Resource Recovery Technologies to the Maximum Extent Practicable**

The selected remedy represents the maximum extent to which permanent solutions and treatment technologies can be used in a cost-effective manner at this site. Of those alternatives that are protective of human health and the environment and that comply with ARARs, U.S. EPA has determined that the selected remedy provides the best balance in terms of long-term effectiveness and permanence, reduction of toxicity, mobility, or volume of contaminants, short term effectiveness, implementability, and cost, taking into consideration State and community acceptance.

The installation and maintenance of a final cover for the landfill, ground water monitoring, and restriction of site access through installation of a fence and institutional controls, will provide the most permanent solution practical, proportionate to the cost.

5. **Preference for Treatment as a Principal Element**

Based on current information, U.S. EPA and the State of Indiana believe that the selected remedy is protective of human health and the environment and utilizes permanent solutions and alternative treatment technologies to the maximum extent possible. The remedy, however, does not satisfy the statutory preference for treatment of the hazardous substances present at the site as a principal element because such treatment was not found to be practical or cost effective.

and methods by which the risk assessment process was implemented. The Agency believes that the risk assessment process was conducted in accordance with accepted guidance, applying site-specific factors and utilizing reasonable yet conservative assumptions where required. In nearly every instance, the alternative approach or assumption as suggested by the commentors would not have affected the choice of the proposed remedy.

Because of the voluminous, redundant nature of the comments received from the three PRPs, they will be addressed in summary fashion, grouping comments under major headings. Comments will be numbered sequentially under each heading for ease of reference. See the Administrative Record for the specific comments.

Comments on Assessment of Future Use of the Site

Comment F1: One commentor stated that "The State of Indiana and U.S. EPA uniformly agree that the property should not and will not be used for the construction of any buildings." The commentor provided two letters from the Chief of the Facilities Inspection Section of the Indiana Board of Health to the Elkhart County Health Department recommending against construction of residences on the site. (Miles)

Response F1: The letters provided only advise against construction of buildings on the site; they do not prohibit construction on the landfill. In addition, the letters are focussed on construction on the landfill itself. They do not address the parts of the Site beyond the bounds of the landfilled area.

Comment F2: The same commentor also said installing groundwater wells at the landfill is prohibited by Indiana law. (Miles)

Response F2: The commentor is referring to Indiana Administrative Code, 310 IAC Section 16-3-2, which says that a "well shall be located as follows: ...(2) as far as practicable from any: ...(B) known contamination source. This does not outright forbid a well being installed on the site. The risk assessment process looked at future risk scenarios in terms of what is reasonably possible for the entire site if no remediation took place, not what could potentially be prevented through institutional controls (a remedial measure) on the landfill.

Comment F3: One commentor stated that U.S. EPA guidance suggests that risk assessments should include a qualitative statement of the likelihood of the future land use occurring and quoted the Risk Assessment as saying that 'this scenario' (residential or commercial development) "may not be technically and/or financially reasonable". (Geraghty & Miller)

Response F3: The Risk Assessment does state that, "...composition of the natural soils in combination with the shallow water table and fill material would make construction on the site difficult and potentially costly." However, it goes on to say that construction "along the perimeter of the site (not on the landfill) would be more feasible."

Comment F4: Commentors stated that U.S. EPA incorrectly assumed that the HIMCO property will be used in the future for residential, industrial, and agricultural purposes and that construction will occur on the landfill. One commentor indicated that the NCP requires U.S. EPA to evaluate the likelihood that future populations will be exposed to contaminants on the subject property. (Miles, Geraghty & Miller, Himco Waste-Away Service/ Mittelhauser)

Response F4: The Agency does not agree that there is "no doubt" that the site will never be used for any residential, agricultural or industrial purposes. In fact, inquiries as to the feasibility of site development for residential and light industry were explored as recently as 1984.

The role of the baseline risk assessment is to develop scenarios for relevant, possible land uses in the absence of institutional controls. Residential, agricultural, and industrial uses are all possible although their likelihood differs. The possibility of each of these is based on factors including surrounding land use in the area, historical uses of the land (portions of the site were once agricultural) and developmental feasibility. Additionally, the baseline risk assessment provides qualitative information on the likelihood of a future land use actually occurring. For instance, at this site the risk assessment clearly stated that there is low probability of a future residential or commercial land use (at least on the landfilled area), there is some likelihood of the site returning to agricultural uses, and there is some probability that the site could be developed for recreation. This type of information provides the EPA risk manager the basis for selecting the extent of remediation which will be required.

It is important to distinguish between the "site" and the "landfill." There is nothing at this time that renders it unlikely that homes may be built on the site south of the landfill. Homes have been built along County Road 10 south of the landfill. The contaminated area between County Road 10 and the landfill is obviously a place where people might be likely to build homes if it were not for the risk posed by soil contamination and contaminated leachate. Institutional controls such as zoning prohibitions, fencing, posting of signs and other restrictions simply cannot ensure that the site will never be used in the future. Since there is some likelihood of some kind of future use (people have even been known to place homes on landfills), it is appropriate for the risk assessment to evaluate such exposures and for risk management decisions to take this information into account in making remedial decisions.

Comments on the ground water pathway

Comment G1: One commentor quoted the RI/FS that revealed "very little or no ground water contamination outside the boundary of the landfill" and that "ground water has not been impacted to a level of health and environmental concern by the site contaminants," and concurred with these conclusions. (Geraghty & Miller)

Response G1: The U.S. EPA acknowledges the commentor's concurrence with our conclusions.

Comment G2: The groundwater pathway should be eliminated because the ground water is not currently used, is not potable and is not likely to be used in the future. (Miles, Geraghty & Miller, Himco Waste-Away Service/Mittelhauser)

Response G2: Although there are no current users adjacent to the landfill, there are drinking water wells in the nearby surrounding area. As recently as a year ago a resident just southwest of the landfill drilled a drinking water well. It is not certain that the groundwater will never be used as a drinking water source; therefore, it is appropriate to evaluate such a possibility. The aquifer in question is a Class II aquifer, and so, the Agency is obligated to protect it. The contaminants of concern (listed in Table 4 of the ROD) identified in the groundwater below the landfill clearly present an unacceptable risk and cannot be allowed to migrate. The construction of a cap over the landfill will help prevent the generation of additional leachate and the contamination from migrating in the future, and the ground water monitoring will detect if this remedy does not provide the containment/control expected. If the contamination had been shown to have migrated already, the Agency would be obligated to restore this Class II aquifer.

Other Comments Regarding the Risk Assessment

Comment R1: The trespasser scenario is incorrect for the following reasons: 1) the activity is illegal, 2) the emission rate did not account for days of precipitation, and 3) two different numbers were used for silt content. (Miles)

Response R1: 1) The legality of a human activity is not relevant in evaluating exposure. There is sufficient evidence that dirt bike riding occurs at the site to warrant its inclusion. Trails are evident and the activity was observed during field work at the site. Exposure thus occurs whether the rider has gained legal access to the site or not.

2) The emission rate is calculated only during a bike riding event. It was assumed that bike riding would only occur on days when it was not raining. (If a person rode in the rain, the emissions would probably not occur, therefore there would be no exposure.) For this reason the term in Cowherd's equation accounting for days of precipitation would be equal to one. Thus the emission rate calculated in the risk assessment would not change with the inclusion of this parameter.

3) Both the dirt bike and tilling models require a silt content term in their respective equations. These activities are assumed to occur in different areas of the site. During the remedial investigation, samples from these respective areas were analyzed for grain size. An estimate of silt content is also made with these analyses. These results were used in the modeling. It is not surprising, it is even expected, that silt content varies from location to location across different areas of the site.

Comment R2: The box model was inappropriately applied for the following reasons: 1) use of one-half the height of the box, 2) the calculation of X, 3) the average wind speed measurement, 4) the lack of a dispersion model for the downwind receptor, 5) the unrealistic assumption that an adult will dirt bike ride on the landfill for 30 years. (Miles)

Response R2: 1). One-half the height of the box was used in the calculations for the following reasons. First it was assumed that the upwind edge of the box was located at the upwind edge of the source area and the downwind edge of the box occurred at the downwind edge of the source area. A plume of suspended particles was assumed to rise from the upwind edge of the box and reach the mixing height calculated at the downwind edge of the source. Since a hypothetical resident or dirt bike rider could live or ride anywhere within this box, the average height of the box (H/2) was used to calculate exposure to that individual. This approach may tend to overestimate exposure for a resident (or rider) living (or riding) near the downwind edge of the box and underestimate exposure for a resident (or rider) at the upwind edge of the box.

2) It is true that the assumption that the box is square is not stated in the risk assessment. This assumption was indeed made; the calculation of X is correct.

3) The wind speed from the nearest available weather station was used in place of on-site meteorological data, which were not available. It is likely that the measurement was made at a height of 10 meters. It is also assumed that obstructions near the surface would slow the windspeed, resulting in a lower annual

average wind speed at the height used in the box model. Use of a higher windspeed than actually occurs at the height that was evaluated is likely to have underestimated exposure. The magnitude of this underestimate cannot be reliably estimated.

4) It is agreed that the box model is not reliable for estimating exposures at significant distances downwind from a source. However, at this site, the nearest off-site current residents are located just east of the edge of the landfill. Therefore, they were assumed to be located effectively at the downwind edge of the box. While some uncertainty was introduced by assuming that the nearest current resident was located at the downwind edge of the box, it was judged acceptable for risk assessment purposes. It should be remembered that this is not a sophisticated model--its intent is for screening purposes. The model predicted very low emissions which represent risks well within an acceptable range. Risks contributed by this pathway were not significant relative to overall site risks and did not form the basis for the proposed remedy. Further refinement of the air pathway is not warranted.

5) The Agency disagrees that the adult dirt bike rider is unrealistic. Adulthood does not necessary bring the cessation of this type of activity. Again, the pathways involving air exposures were not significant in their contribution to total site risk. Therefore the use of exposure factors that the commentor feels are overly conservative did not influence the selection of a remedy.

One commentor offered a number of comments about other exposure analyses, as follows. (Miles)

<u>Comment R3a:</u> The soil concentrations are biased high and misapplied since sampling was not random.

<u>Response R3a:</u> The sampling design utilized at this site was a stratified systematic design. The design was a consistent pattern apportioned across the site areas. Two exposure areas were defined and assumed: on the landfill and south of the landfill. This method, while not random, is nevertheless unbiased. It is appropriate for use in defining representative concentration values over the two exposure areas. If the sampling were biased, averaging samples over an exposure area would not have been appropriate.

<u>Comment R3b:</u> Episodic air emissions should not be added to steady-state long-term atmospheric exposures in the UBK model for lead.

<u>Response R3b:</u> It is true that the UBK model does not routinely handle episodic air emissions. The UBK model does allow for both

an ambient air default or other inputs based on site measurements or predictions from air modeling. At this site, the additional emissions predicted from the tilling or dirt bike riding activities are several orders of magnitude lower than the ambient default value in the model. Therefore, addition of the episodic emissions had no effect on the model outcome.

Comment R3c: Assumed parameters for exposure factors are arbitrary. For example, the skin surface area for children (commentor did not identify any other examples.)

Response R3c: It is true that the use of an assumed skin surface area of 10,000 cm^2 is slightly higher than the value now recommended by EPA in its Dermal Guidance document. That value is 8,000 cm^2, which is the 95th percentile of the average of age classes 1-6. Use of this number would slightly lower the risk estimates for children via dermal exposures to groundwater. (For example, the excess cancer risk estimates for the hypothetical future child resident on the landfill would drop from 7E-01 to 6E-01.) This is not a significant difference.

The revision of the Exposure Factors Handbook, referred to by the commentor, is still a preliminary draft (July 1991). However, the values suggested in that draft correspond to the values suggested in the released Dermal Guidance (as described above).

Comment R3d: Two HIF terms in the evaluation of the agricultural worker were reversed.

Response R3d: The Agency agrees these terms were inadvertently reversed when risk calculations were performed. This error has been corrected and the risk results are summarized below:

Route	Cancer Risk (original)	Cancer Risk (revised)	HI (original)	HI (revised)
Ingestion of Groundwater	3E-03	3E-03	1E+01	1E+01
Ingestion of Soil	4E-06	4E-06	2E-02	2E-02
Inhalation-Particulates	5E-05	2E-06	4E+00	2E-01
Inhalation-Volatiles	2E-09	3E-08	4E-06	7E-05
Total (all pathways)	3E-03	3E-03	1E+01	1E+01

As seen above, total risks to the population would not change although the individual pathway risks are different. Again, the inhalation pathway contributes little to overall risk and those results did not form the basis for the selection of a remedy.

Comment R3e: The exposure assessment for showering arbitrarily assumes inhalation intake is twice oral intake.

Response R3e: This assumption is not arbitrary but based on several experimental studies as cited in the risk assessment. It is agreed that this is a simplifying assumption applied as if all the volatiles present in groundwater volatilize equally. It was, however, applied only to those compounds which volatilize easily. The relative bioavailability, if relevant, was accounted for in the toxicity value applied for each route. It should be noted that the inhalation of volatiles from household uses of groundwater contributes relatively little to the overall risk from groundwater pathways.

Comment R3f: The estimate of PM10 in the air for an agricultural worker (35 mg/m^3) is excessive and unreasonable.

Response R3f: Tilling dry fields is a dusty activity. Whether it exceeds an OSHA limit is irrelevant. It is acknowledged, however, that the estimate derived in the risk assessment is conservative. The model used is a screening level procedure. Despite the use of this high-end estimate, there is no cause for concern from the site via this pathway and these results did not form the basis for the selected remedy.

Comment R3g: Endpoint specific estimates of noncarcinogenic hazard indices should have been developed.

Response R3g: It is appropriate to segregate the compounds by effect and/or mechanism if the HI is greater than one as a result of summing. That is, if the HI becomes greater than one because individual HQ values are each less than one. At this site, individual HQs for a number of chemical each exceed one, therefore this segregation step is not required.

Comment R4: Two commentors questioned the use of one-half the detection limit to estimate ground water concentrations. One indicated that the use of one-half the detection limit of compounds found in soil and leachate samples to estimate concentrations in groundwater violates EPA's guidance, which they believe is invalid between different media. (Miles, Himco Waste-Away Services/Mittelhauser)

Response R4: The Agency believes the use of one-half the detection limit is appropriate. The reference the commentor cites (RAGS pg. 5-10) is silent on the concept of "in a medium". It is true that the guidance does instruct the risk assessor to generally eliminate chemicals that have not been detected in any samples from a particular medium. It furthermore states that if information indicates that the chemicals are likely to be present in a medium, based on fate and transport mechanisms, they should not be eliminated. The guidance uses an example of soil contaminants that can leach to groundwater where those compounds have not yet been detected at some given laboratory quantification level. This concept has been similarly applied for the leachate. The term leachate, as used throughout the remedial investigation, may be somewhat misleading. In reality, this leachate is groundwater in contact with or contaminated by the waste material in the landfill. This leachate is highly contaminated as evidenced by the water samples taken from test pits when the water table was encountered. Although these chemicals have not been detected in the existing wells south of the landfill, there is the potential that these chemicals could migrate from the areas where they have been detected. In this case, the use of one-half the detection limit is an appropriate surrogate. The RAGS guidance clearly indicates that nondetects should not simply be eliminated from the risk assessment, or a value of zero be applied.

The detection limits presented in the tables in Appendix 2 of the risk assessment (range of nondetects) were reported by the analytical laboratories as contract-required detection limits, with adjustments for dilution and percent moisture made where applicable. These levels generally correspond to the limit of quantification. It is agreed that sample quantification limits are more relevant for evaluating nondetects. They were, however, not available. Instrument detection limits, however, are not suitable for use in a risk assessment since factors such as sample preparation, dilution, etc. are not considered.

It is true that this method of estimating exposure point concentrations indicated high risk levels from chemicals that may really be absent. On the other hand, they may be present at levels just below what the laboratory can measure, resulting in even higher risk than that calculated. This information was utilized in the risk management decision not to require treatment of the groundwater, but to further monitor the situation.

Comment R5: Total site risks were calculated and background risks were not excluded from risk estimates. (Miles)

Response R5: The Agency's RAGS guidance clearly instructs the risk assessor to calculate total site risk and suggests calculating background risk separately from site-related risk (RAGS, Pg. 5-18) if the risk assessor believes that background chemicals (or non-site-related chemicals) are significantly contributing to unacceptable risk. This is the methodology employed at this site. The results as presented in the risk assessment indicate that there is a portion of the total site risk attributable to background (either naturally occurring or upgradient sources). This information was considered in the risk management decision not to require treatment of the groundwater, but to further monitor the situation.

It is true that the Agency's Data Useability Guidance instructs the risk assessor that chemicals falling within naturally-occurring levels AND below a concentration of concern may be eliminated from the risk assessment. Since a number of naturally occurring chemicals were present at levels approaching a level of concern, no naturally occurring chemicals were eliminated from the risk assessment.

<u>Comment R6:</u> U.S. EPA improperly included leachate data to calculate ground water contamination. (Miles)

<u>Response R6:</u> As stated previously, in Response R4, above, the leachate is indeed contaminated groundwater. In calculating exposure point concentrations for groundwater in this area, a combination of leachate samples and groundwater wells in the proximate area were used to estimate the concentrations of these chemicals that would be available to a future hypothetical receptor. Based on the site subsurface data, it is possible that a pumping well installed in the landfill area will capture some leachate. However, because of the highly heterogeneous nature of the landfill, it is not possible to make a realistic prediction of how much and for how long leachate will be captured by the pumping well, therefore leachate data were included in the risk assessment for exposure to the groundwater under the future land-use scenario.

<u>Comment R7:</u> Chemicals detected infrequently should have been eliminated from the risk assessment and chemicals attributable to blank contamination should also be eliminated. (Miles)

<u>Response R7:</u> The commentor infers that application of a frequency of detect rule is required, when in fact it is an option. Guidance indicates "If conducting a risk assessment on a large number of chemicals is feasible...then the procedures in this section (including frequency of detection) should not be used" (RAGS, Pg. 5-20).

As stated on Page 2-7 of the Risk Assessment, an analysis of blank contamination was conducted according to EPA guidance. This guidance applies a "5X or 10X" rule for chemicals detected both in blanks and in the actual samples. Data points were thus modified as appropriate.

<u>Comment R8:</u> The toxicity assessment is incorrect because: 1) outdated toxicity values were used, 2) the TEF approach for PAHs was not used and 3) the oral absorption for beryllium was not addressed. (Miles)

Response R8: 1) The toxicity assessment was performed in April, 1992 using toxicity values current at that time. The Agency does not require the risk assessment be updated every time a toxicity value changes. The magnitude of the effect on the risk estimates for benzo(a)pyrene would not be significant considering that risk estimates are rounded to one significant figure. Neither does the Agency recommend the development of "site-specific" toxicity values.

2) There is no final Agency position as yet on the toxicity equivalency approach for PAHs. The approach remains under review. Therefore, the risk characterization for PAHs in this site risk assessment meets the current guidance, which is to apply the slope factor for benzo(a)pyrene to all carcinogenic PAHs.

3) The Agency recognizes that there is uncertainty involved in both estimating oral absorption factors for many chemicals, including beryllium, and in the current methodology for extrapolating toxicity values from an oral exposure route to a dermal exposure route.

The only dermal route quantified at this site was dermal exposures to groundwater while showering and incidental exposure to waders at the on-site ponds. While risks for the surface water exposures were well within an acceptable risk range, dermal exposures to groundwater, via beryllium were higher. They were nevertheless not significant when compared to other pathways involving exposures to groundwater. The considerable uncertainty in evaluating dermal pathways contributed to the risk management decision not to require treatment of the groundwater at this time, but to further monitor groundwater at the site.

Comment R9: Data validation procedures are not sufficiently documented. (Miles)

Response R9: As mentioned on page 2-6 of the risk assessment, data collected were reviewed and validated by U.S.EPA according to standard validation procedures for the Contract Laboratory Program. This validation was conducted by Region V's Central Regional Laboratory. Results of the validator's comments were incorporated into the database used for risk assessment calculations. As a result of this effort, a number of R-qualified data points were eliminated from use in the risk calculations. (R-qualified data points are data points which the data validator indicated are unusable because the presence of the compound in question cannot be verified.)

Comment R10: Major sources of uncertainty were not considered in the risk assessment, including unacceptable spike recovery data and the uncertainty due to the assumption of all chromium as hexavalent. (Miles)

Response R10: The Agency believes that uncertainties have been sufficiently documented. In the two examples cited by the commentor the following responses are offered:

1) The occurrence of an out of control spike does not necessarily warrant an unusable condition. Rather, affected data are generally "J" or "UJ" qualified, and as such are still usable for risk assessment purposes.

2) It is acknowledged that the assumption that all chromium occurs in the hexavalent form is conservative. This would be particularly relevant when quantifying an air pathway, since hexavalent chromium is considered carcinogenic; trivalent chromium is not. However, estimates of risk from these pathways were not significant when compared to total site risk and did not form the basis for the proposed remedy.

Comments regarding Site Characterization

Comment S1: All three commentors indicated that U.S. EPA failed to consider the effectiveness of the existing calcium sulfate cover and layering. (Miles, Himco Waste-Away Services/Mittelhauser, Geraghty & Miller)

Response S1: The analytical results of the leachate samples from the landfill indicate that the landfill contains wastes contaminated with organic and inorganic compounds. The proposed remedy for this site includes a composite cap to alleviate potential exposures to the landfill wastes. The commentors claim that the calcium sulfate waste dumped at the landfill is sufficient to eliminate present and future exposures to the landfill wastes and is protective of human health and the environment. U. S. EPA does not agree with this evaluation for the following reasons:

* The calcium sulfate layer has not been placed on the landfill under an engineering-controlled system as required by U.S. EPA and IDEM for a clay cover on a landfill.

* The thickness of the calcium sulfate layer is not sufficient in many areas of the landfill. The thickness was less than 2 feet in 62.5 percent of test pits excavated on the landfill.

* The chemical interaction between water and calcium sulfate make it less favorable as a cap material relative to most clayey materials.

Comment S2: One commentor provided a sworn affidavit of Mr. Jerry D. Perrin, former employee at the HIMCO Dump, taken on

November 30, 1992, in which he states, "I placed all the wastes between successive layers of soil and a material known as calcium sulfate." (Miles)

<u>Response S2:</u> Field observations of test pits do not confirm this statement. Twenty-four test pits were excavated in the landfill as a part of the RI for this site. Of these, eight test pits were observed to have alternating layers of calcium sulfate and waste (TD-3, TL-1, TP-9, TP-10, TP-11, TP-12, TP-13, and TP-20), indicating daily coverage of waste with a calcium sulfate layer. Alternating layers of waste and calcium sulfate were not observed in the majority of the test pits excavated in the landfill (16 of 24, or 66.7 percent). One possible explanation for the discrepancy between Mr. Perrin's statement and the actual field observations is the lag time between the landfilling operation and Mr. Perrin's employment with the Himco Dump. Mr. Perrin worked at Himco between 1970 and 1976; however, the site was in operation between 1960 and 1976. Based on the above information and the unbiased distribution of the test pits in the landfill area, it is apparent that daily coverage was not practiced in more than 50 percent of the landfilling operation.

<u>Comment S3:</u> In Mr. Perrin's affidavit, he states, "When the landfill was closed in 1976, Himco placed a final cover of calcium sulfate averaging at least two feet thick..." (Miles)

<u>Response S3:</u> This statement is not supported by the field data. The calcium sulfate cover thickness was found to be less than 2.0 feet in 15 of the 24 test pits excavated (62.5 percent). In addition, the calcium sulfate layer was less than or equal to 0.5 feet in five of the test pits on the landfill. Based on the above information and the unbiased distribution of the test pits in the landfill area, it can be concluded that a layer of calcium sulfate 2 feet or more thick has not been placed in more than half of the landfill area.

<u>Comment S4:</u> Assumptions used by U.S. EPA for compacted vegetative layers are inconsistent with accepted practice. (Geraghty & Miller)

<u>Response S4:</u> It is well documented on landfill closures and on mine reclamation projects that placement of vegetative support and topsoil layers by modern equipment will create greater compaction than most natural soil conditions. Agricultural tillage practices are typically designed around minimizing compaction; soil placement practices usually are not.

Regardless of the placement method, the use of compacted vegetative support layers in modeling reduces infiltration. The barrier layers can be modeled alone, and the results will still reflect that the composite system results in the least amount of infiltration.

We agree that excessive compaction can impact vegetative success, but this modeling task alone does not address technical specifications or the selection of vegetation species which can be successful.

Comment S5: Assumptions used by U.S. EPA for runoff curve numbers are inconsistent with accepted practice. (Geraghty & Miller)

Response S5: High curve numbers (CN) were used to emphasize the impact of the barrier layer. The lower the infiltration rate, the more efficient the barrier must be to prevent deeper infiltration. We agree that the CN could have been lower to reflect expected vegetative and soil conditions if construction is successful. To show that the composite liner still is the most effective, we re-ran the modeling with default values and with a CN of 95. In each case the vegetation layer was uncompacted. The following table shows the infiltration under various cap designs.

Annual Infiltration
Under Different Cap Designs

	CN=95 **Poor Grass**	**CN=66** **Poor Grass**	**CN=66** **Good Grass**
No Action (Zone A)	4.6 in.	4.6 in.	4.5 in.
Single Clay Cap	2.9 in.	7.2 in.	7.0 in.
Composite Cap	0.001 in.	0.001 in.	0.001 in.

The estimated higher infiltration for a single cap relative to the No Action Alternative is due to the errors associated with the numerical simulation of the infiltration. For example, the No Action Alternative depicts the top 1-inch of calcium sulfate as the vegetative layer with the remainder acting as a barrier soil. This creates a condition of increased runoff and lower soil water evapotranspiration. Accurate field data equating calcium sulfate to barrier soil properties would allow more accurate determinations to be made. None the less, the table shows that the composite cap provides the best protection against infiltration. Therefore, the composite cap option is the best performer.

Comment S6: Assumptions used by U.S. EPA for vegetative cover conditions are inconsistent with accepted practice. (Geraghty & Miller)

Response S6: The use of a full vegetative coverage in the modeling reduces the infiltration by modeling evapotranspiration. The poor cover is used to determine the effectiveness of the barrier rather than relying on successful vegetation to minimize infiltration. As is shown in the above table, the use of poor or good vegetative cover has minimal modeling impact on the infiltration rate. The composite cover is still the best available option.

Comment S7: Assumptions used by U.S. EPA for soil barrier texture number are inconsistent with accepted practice. (Geraghty & Miller)

Response S7: The use of the barrier soil with a HELP (model) texture number of 16 and 17 was performed. Texture 16 reflects a permeability of $1x10^{-7}$ cm/sec and texture 17 reflects $1x10^{-8}$ cm/sec. The modeling results with a CN=66, poor grass, and no compaction of vegetative layers are summarized in the following table:

Single Clay

Soil Barrier	Infiltration
Texture 16	1.25 in.
Texture 17	0.13 in.

Published papers have documented that a field permeability of $1x10^{-7}$ cm/sec is difficult to achieve. It is our opinion that $1x10^{-8}$ cm/sec would not be achievable on a landfill cover due to an unstable foundation (waste) and long-term vegetation and animal impacts.

However, modeling still shows that a single clay cap is less effective than a composite cover. With the absence of a base liner, leachate extraction system, and the close proximity to groundwater, U.S. EPA believes the cover must provide the best restriction to infiltration. If a cost-benefit analysis is required to predict how much infiltration is allowable, the HELP modeling will not give that answer. Source control has been proven as the most effective control of potential groundwater contamination; therefore, since source removal is not part of the selected remedy, the most effective cap should be employed.

Comment S8: One commentor provided a lengthy, admittedly "obviously idealized" characterization of the hydrogeology of the landfill, concluding that the landfill area had been "silted in" prior to landfilling, which, in effect, created a natural liner under the landfill. The commentor states that SEC Donahue failed to identify this natural liner. (Himco Waste-Away Services/Mittelhauser)

Response S8: U.S. EPA feels this portrayal of the landfill hydrogeology is not accurate for the following reasons:

* The high permeability glacial outwash deposits in the region, and man-made structural barriers (e.g., roads, trenches, etc.) prevent excessive surface runoffs in the site vicinity. These features do not support the hypothesis of standing water in the landfill area and the resulting formation of a natural silt/clay liner during its geologic history prior to the landfill operation at the Himco site.

* Aerial photographs taken in August 1965, when landfilling occurred in an approximately 6.5-acre area southeast of the site, show no standing water in the landfill area.

* All borings preformed in and around the site (e.g., B-1, B-3, B-8, B-11, E-1, B-7, M-1, M-2) (see Figures 3-9 and 3-11 of the RI report) without exception show no silt and clay layers at the approximate base elevation of the landfill. All of the borings indicate sand and gravel deposits classified as SP or SW in the Unified Soil Classification System, extending from surface to the bottom elevation of the borings. Silt and clay layers occasionally were encountered in the borings; however, none were encountered at the level corresponding to the base of the landfill (an approximate elevation of 755 feet MSL).

<u>Comment S9:</u> One commentor provided a discussion regarding the PAH compounds determined to be present in the south portion of the landfill, conjecturing that they may be attributable to peat or to asphalt, since they believe no coal tar wastes were disposed of in the landfill. (Himco Waste-Away Services/ Mittelhauser)

<u>Response S9:</u> The source of the PAH compounds found in the south portion of the Site was not determined. Presumably, they were disposed during landfill operations. In any case, they are hazardous substances that have come to be located on a Superfund site and have been determined to present a significant risk and therefore, must be remediated.

<u>Comments on the No Action Alternative</u>

<u>Comment N1:</u> The remedial action objectives are fully satisfied by No Action. (Miles, Geraghty & Miller, Himco Waste-Away Services/Mittelhauser)

<u>Response N1:</u> The results of the RI indicate that the waste mass is contaminated by VOC's, SVOCs and inorganics. The results of the baseline risk assessment indicate unacceptable carcinogenic and/or noncarcinogenic risks for human exposures to the landfill contents, primarily due to exposure to highly contaminated

groundwater, i.e., leachate. The FS identified remedial action objectives (RAOs) for the Himco site (page 2-2 of the FS). None of these objectives are met by No Action.

* Direct contact with the landfill wastes is not prevented. The suggestion that the inclusion of calcium sulfate as cover material has resulted in the construction of an engineered waste encapsulation unit is not correct. Field logs do not confirm uniform grading of a calcium sulfate cap that would meet today's standard for landfill closure activities.

* Groundwater usage in the site vicinity is not controlled by No Action, as a new well was just installed south of the landfill while the RI/FS was undertaken.

* The calcium sulfate cover does not effectively control leachate generation in the landfill. No Action would allow the continued percolation of rainfall across the landfill.

* No Action would allow the continuing migration of contaminants from the waste mass to the groundwater beneath the site and would allow the migration of VOCs and noxious odors from the site due to the lack of vapor controls from the landfill.

* The long-term cap integrity will not be maintained because surface runoff control and a gas collection system will not be implemented under the No Action alternative.

Comment N2: U.S. EPA failed to develop the No Action alternative. One commentor requested that U. S. EPA reexamine the ARARs compliance of the No Action Alternative. (Miles, Geraghty & Miller, Himco Waste-Away Services/Mittelhauser)

Response N2: The No Action alternative has been adequately evaluated, along with three other alternatives, in the FS reports. Each alternative was evaluated against the nine criteria established by the NCP for detailed analysis of alternatives. Table 4-5 of the FS report presents a summary of this evaluation. The No Action alternative does not achieve the threshold criterion of overall protection of public health and the environment. The No Action alternative would not be protective of human health and the environment for the following reasons:

* The calcium sulfate cover is not in compliance with today's standards for caps on landfills and would allow the continued percolation of rainfall across the landfill. Although the calcium sulfate does retard the percolation of rainfall across the landfill, the calcium sulfate was not

placed in the landfill uniformly, so the potential for channeling and leakage of infiltration into the landfill is high.

* The calcium sulfate cap is prone to dissolution and erosion as a result of surface water percolation into the landfill. This effect was observed in some test pits performed in the landfill. The test pits showed calcium sulfate thickness of less than 6 inches.

* The chemical interaction between water and calcium sulfate make it less favorable as a cap material relative to most clayey materials.

* The No Action alternative would allow the migration of VOCs and noxious odors from the site due to the lack of vapor controls in the landfill. EPA received frequent complaints from the residents in the vicinity of the landfill regarding odors from the landfill. One such complaint was voiced in the public meeting for the proposed plan.

* The No Action alternative would allow direct contact with the landfill waste material which is contaminated with both organic and inorganic compounds. The test pits performed during the RI showed calcium sulfate cover thickness of equal or less than 6 inches in five test pits and less than 2 feet in 62.5 percent of the test pits.

* The No Action alternative would allow other potential risks as described in the FS report.

The No Action Alternative does not have to be carried through the comparative analysis if it is shown that it does not pass the threshold criteria. Clearly, the No Action Alternative does not pass these criteria for the HIMCO Dump Site.

Comments regarding Other Remedial Alternatives

Comment O1: U.S. EPA failed to ensure that appropriate remedial alternatives are developed. (Miles)

Response O1: The FS report systematically evaluates an array of remedial technologies, formulates a range of alternatives, and screens the developed alternatives in detail according to the guidelines presented in both Conducting RI/FS for CERCLA Municipal Landfill Sites and Guidance for Conducting RI/FS under CERCLA. Each of the alternatives, including No Action, were fully developed and evaluated in the FS report.

The only difference between the Himco FS and a typical FS is that screening a universe of technologies, as suggested under EPA's guidance for the RI/FS, was not included in the Himco FS. This approach was undertaken because landfills have similar characteristics and EPA has, based on its experience and according to guidance, established a number of expectations as to the type of remedial alternatives to be evaluated for municipal landfills.

Comment O2: One commentor stated that the need for an active landfill gas collection and treatment system has not been demonstrated. (Geraghty & Miller)

Response O2: U.S. EPA acknowledges that the gas generation rate in the Himco site is not like typical municipal landfills as a result of the high volume of calcium sulfate waste disposed of at this site. However, considerable gas generation has been documented for this site. For example, the air monitoring performed as a part of the safety requirements during installation of test pits showed high levels of organic vapor and presence of hydrogen sulfide (H_2S). Additionally, numerous complaints regarding odor have been expressed by residents in the vicinity of the landfill. One such complaint was voiced in the Proposed Plan public meeting. In addition to gas generation due to the decomposition of non-calcium sulfate wastes, it is also likely that the reduction of sulfates to hydrogen sulfide under anaerobic conditions within the landfill is a source of the odors noted at this site. Based on this information, the FS included gas remediation as a part of the selected remedy for the Himco site.

In calculating the gas generation rate, only one third of the material in the landfill was used as possible methane producing material. As presented in the Technical Memorandum A5, the total gas generation rate ranged from 6.68×10^6 SCF/yr to 66.8×10^6 SCF/yr or equivalent to 0.010 SCF/lb/yr to 0.1 SCF/lb/yr. If the factor of 1/3 gas-producing waste volume (0.02 to 0.3 SCF/lb/yr) would be considered, the range encompasses the figure 0.15 SCF/lb/yr indicated by the commentor as a "typical gas generator rate" in the landfill.

It should be noted that the result of the gas generation rate did not have a significant effect on the selected remedy or cost estimate for the selected remedy.

Comment O3: One commentor stated that they believe the costs given in the FS Report for the two capping systems appear to be underestimated. (Geraghty & Miller)

Response O3: The quotes used in estimating capping costs are documented in Appendix B4 - Index of Telephone Logs of the Final Feasibility Study Report for the Himco Dump Superfund Site. The quote taken from a local vendor only includes the soil material and haul costs, as stated in the telephone log. Similar quotes were received from other local vendors for soil material and haul. The costs for placement and compaction of this material are included in the cost estimate for capping at this site (see Appendix B1 Cost Assumption tables). The costs for placement and compaction were compiled from the Means Heavy Construction Cost Data, 1992 (Means). Because the quotes that were received were low relative to estimates from Means, estimates from Means for material and haul were used as the Upper Limit value in the cost Sensitivity Analysis in the FS.

Comment O4: One commentor stated that the leachate collection system described in Alternative 3 is ill-conceived and not well-thought out. (Himco Waste-Away Services/Mittelhauser)

Response O4: U. S. EPA does not agree with the commentor's assertion that the Agency does not have a basic understanding of the Site hydrogeology. The commentor provided little more than conjecture, without technical information to back it up, that the leachate collection system is not well designed.

Because there is no aquitard under the HIMCO Dump to isolate the waste mass from the aquifer and the waste mass is in contact with ground water at least part of the year, it was judged that the leachate collection system would need to consist of vertical wells distributed throughout the whole landfill area to capture the leachate.

Comment O5: One commentor stated that the Selected Remedy is inconsistent with the NCP because it is not cost-effective. (Miles)

Response O5: Cost effectiveness is determined by evaluating overall effectiveness, which is based on long-term effectiveness and permanence, reduction of toxicity, mobility, or volume through treatment, and short-term effectiveness. U.S. EPA believes that the Selected Remedy is cost-effective because it provides the best balance of these three criteria and the cost is proportional to the overall effectiveness. The Agency does not agree with the commentor's assertion that No Action is appropriate, or that institutional controls provide the same remedial value as the proposed cap. The Agency's rationale has been explained in previous responses.

Summary of Other Comments Received

Comment S1: The Conclusions of the RI/FS and U.S. EPA's Proposed Remedy are Arbitrary and Capricious and Contrary to Law. (Miles)

Response S1: The Agency does not agree with the commentor that it acted arbitrarily and capriciously in the performance of the

RI/FS or in its selection of a remedy for the HIMCO Dump Site.

Comment S2: Two commentors indicated that U.S. EPA failed to conduct a proper Preliminary Assessment in violation of the NCP. One commentor concluded that because significant contamination was not found in the ground water during the RI, the sample results used for the HRS score were in error. (Miles, Himco Waste-Away Service/Mittelhauser)

Response S2: U.S. EPA does not agree with these assertions. No evidence is given to substantiate the assertion that past sampling events were in error or that a proper PA was not conducted. The PA/SI sample collection was performed in accordance with NEIC Manual for Groundwater/Subsurface Investigations at Hazardous Waste Sites. Sample preservation and analysis were performed according to CLP procedures. The HRS scoring process includes rigorous quality assurance procedures, which the HIMCO Dump Site passed.

Comment S3: Two commentors indicated that sites which pose no significant risk to public health or the environment should be deleted from the NPL. They assert that the HIMCO Dump Site is such a site. (Miles, Himco Waste-Away Services/Mittelhauser)

Response S3: U.S. EPA agrees that sites that pose no risk to public health or the environment should be deleted from the NPL. However, the Agency does not believe that the HIMCO Dump Site does not pose a risk. The responses to Comments N1 and N2 detail the Agency's position on this issue.

Comment S4: One commentor stated that "Miles and Himco are prepared to fund the erection of an appropriate fence to further prevent site access and to fund reasonable groundwater monitoring. While these controls are unnecessary given the complete lack of a risk at Himco, Miles and Himco are prepared to fund these efforts to address the public concern at the site." (Miles)

Response S4: U.S. EPA thanks Miles and Himco for their offer. However, as stated in the Record of Decision and the above responses to comments, the Agency clearly does not believe that the actions proposed by Miles and Himco are an acceptable remedy for the HIMCO Dump Site.

U.S. EPA ADMINISTRATIVE RECORD
HIMCO DUMP SITE
ELKHART, INDIANA
UPDATE #2
09/30/93

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6	11/25/92	Vermeulen, K., Warner, Norcross & Judd	Gustafson, M., U.S. EPA	Letter re: Hermaseal Company's Support of Miles Inc.'s Comments on the Proposed Plan and Hermaseal's Request to be Deleted as a PRP	2
7	11/27/92	Paulen, R., Barnes & Thornburg	Novak, D., U.S. EPA	Himco Waste-Away Service, Inc.'s Comments on the Remedial Investigation and Feasibility Study	27
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9	11/30/92	Kruger, G. and Kratzmeyer, J., Geraghty & Miller, Inc.	Novak, D., U.S. EPA	Public Comment on the Proposed Plan, Submitted on Behalf of American Home Products Corp.; CTS Corporation; Elkhart General Hospital; EBI Meats, Inc.; Excel Industries, Inc. and Truth Publishing Company	67
10	12/23/92	Dennerline, R., Kirkland & Ellis	Reilly, W., U.S. EPA	Petition to Delete Himco Dump From the National Priorities List (NPL), on Behalf of Miles, Inc.; Himco Waste Away Service, Inc.; Elkhart General Hospital and Truth Publishing Company	159
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14	01/21/93	Adamkus, V., U.S. EPA	Oslan, R., Kirkland & Ellis	U.S. EPA's Response to the January 6, 1993 Letter re: the Petition to Delete Himco Dump From the NPL	1
15	05/22/93	Oslan, R., Kirkland & Ellis	Nash, T., U.S. EPA	Letter re: the ROD and the U.S. EPA's Proposed Action	2

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UPDATE #1

HIMCO DUMP SITE

ELKHART, INDIANA

09/29/92

DOC#	DATE	AUTHOR	RECIPIENT	TITLE/DESCRIPTION	PAGES
1	12/01/89	Lombardo, S., Donohue Engineers	Harris, V., Donohue Engineers	Technical Memorandum	7
2	00/00/91	Donohue Engineers	U.S. EPA	Remedial Investigation, Phase I: Data Summary	124
3	00/00/91	Donohue Field Staff	Harris, V., Donohue Engineers	Technical Memoranda: Numbers 1-16	342
4	05/01/91	Donohue Engineers	U.S. EPA	Remedial Investigation, Phase I: Tentatively Identifed Compounds	19
5	05/02/91	Harris, V., Donohue Engineers	Lance, R., U.S. EPA	Cover Letter to Field Technical Memos	3
6	04/00/92	Donohue & Associates	U.S. EPA	DRAFT--Site Strategy/Remedial Alternative Memorandum	154
7	05/00/92	U.S. EPA	Public	FACT SHEET	2
8	05/00/92	Mittelhauser Corporation	Himco Waste Away Services, Inc.	Immediate Removal Action Work Plan	17
9	06/01/92	Muno, W., U.S. EPA	Paulen, R., Attorney	Cover Letter & Executed Copy of Administrative Order by Consent	17
10	07/16/92	Steadman, P., U.S. EPA	Stoner, M., Property Owner	Results of Sampling	9
11	08/[illegible]	[illegible]	U.S. EPA	Final Remedial Investigation Report: Vol. 1	206
12	08/00/[illegible]	[illegible] Inc.	U.S. EPA	Remedial Investigation Report: Vol. 2, Appendices A, B	388
13	08/00/92	SEC Donohue Inc.	U.S. EPA	Remedial Investigation Report: Vol. 3, Appendices B (Phase II), C	252
14	08/00/92	SEC Donohue Inc.	U.S. EPA	Remedial Investigation Report: Vol. 4, Appendix D	389
15	08/27/92	Curnock, D., Mittelhauser Corp.	Steadman, P., U.S. EPA	Cover Letter & Immediate Removal Action Summary Report	94

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16	09/00/92	SEC Donohue Inc.	U.S. EPA	Addendum to Appendix D (Remedial Investigation Report)	10
17	09/00/92	SEC Donohue Inc.	U.S. EPA	Feasibility Study: Vol. 1	179
18	09/00/92	SEC Donohue Inc.	U.S. EPA	Feasibility Study: Vol. 2	184
19	09/00/92	SEC Donohue Inc.	U.S. EPA	Final Remedial Investigation Report: Vol. 5, Appendices E1, E2, F	744
20	09/00/92	U.S. EPA		Proposed Plan	24

DATA DOCUMENTS INDEX

HIMCO DUMP SITE-UPDATE #1

DATA documents are available for review at:
U.S. EPA Region V Headquarters
77 W. Jackson Blvd.
Chicago, IL

	Title	Pages
1.	Quality Control Documentation/Analytical Data	2000 (approx.)

GUIDANCE DOCUMENTS INDEX

HIMCO DUMP SITE

These documents have not been copied. They may be reviewed at Region V Headquarters, 77 W. Jackson Blvd., Chicago, IL

09/24/92

DOC#	DATE	AUTHOR	TITLE/DESCRIPTION
1	00/00/82	United States Geological Survey	Study & Interpretation of the Chemical Characteristics of Natural Water-Water Supply Paper, No. 1473. 2nd Edition
2	00/00/84	U.S. EPA	Report No. SW-874, Hazardous Waste Land Treatment
3	00/00/86	U.S. EPA	Mobile Treatment Technologies for Superfund Wastes--540/2-86/003(f)
4	00/00/86	U.S. EPA	Superfund Public Health Evaluation Manual--540/1-86/060
5	00/00/87	U.S. EPA	A Compendium of Technologies Used in the Treatment of Hazardous Wastes--625/8-87/014
6	00/00/88	U.S. EPA	Guidance for Conducting Remedial Investigations & Feasibility Studies Under CERCLA--540/G-89/004
7	00/00/88	U.S. EPA	Guidance on Remedial Actions for Contaminated Groundwater at Superfund Sites--540/G-88/033
8	00/00/88	U.S. EPA	Technology Screening Guide for Treatment of CERCLA Soils & Sludges
9	00/00/88	U.S. EPA	The Superfund Innovative Technology Evaluation Program: Technology Profiles--540/5-88/003
10	00/00/89	U.S. EPA. Office of Emergency & Remedial Response	Risk Assessment Guidance for Superfund, Vol. I. Human Health Evaluation Manual (Part A). Interim Final--540/1-89/002
11	00/00/89	U.S. EPA	Technology Demonstration Summary: Shirco Electric Infrared Incineration System at the Peak Oil Superfund Site--540/S5-88/002
12	00/00/90	U.S. EPA	National Priority List: Himco Dump Superfund Site

DOC#	DATE	AUTHOR	TITLE/DESCRIPTION
13	00/00/91	U.S. EPA, Office of Emergency Remedial Response	Conducting Remedial Investigations/Feasibility Studies for CERCLA Municipal Landfill Sites--540/P91/001

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ADMINISTRATIVE RECORD
FOR
HIMCO, INC.

ELKHART, IN.

September 6, 1990

DATE	AUTHOR	RECIPIENT	TITLE/DESCRIPTION	PAGES
08/08/90	ATSDR- J. Carter	ATSDR- L. Fabinski	Memo on residential well data	3
06/28/90	Weston	EPA-D. Heaton	Sampling action	8
10/31/89	R. Bowden	N. Niedergang	Memo on TAT's site inspection	1
10/13/89	Weston	EPA-D. Heaton	TAT site inspection	5

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February 12, 1991

11/06/90	Simon, V., EERB	Ullrich, D., Waste Mgt. Division	Removal Action Memorandum	11